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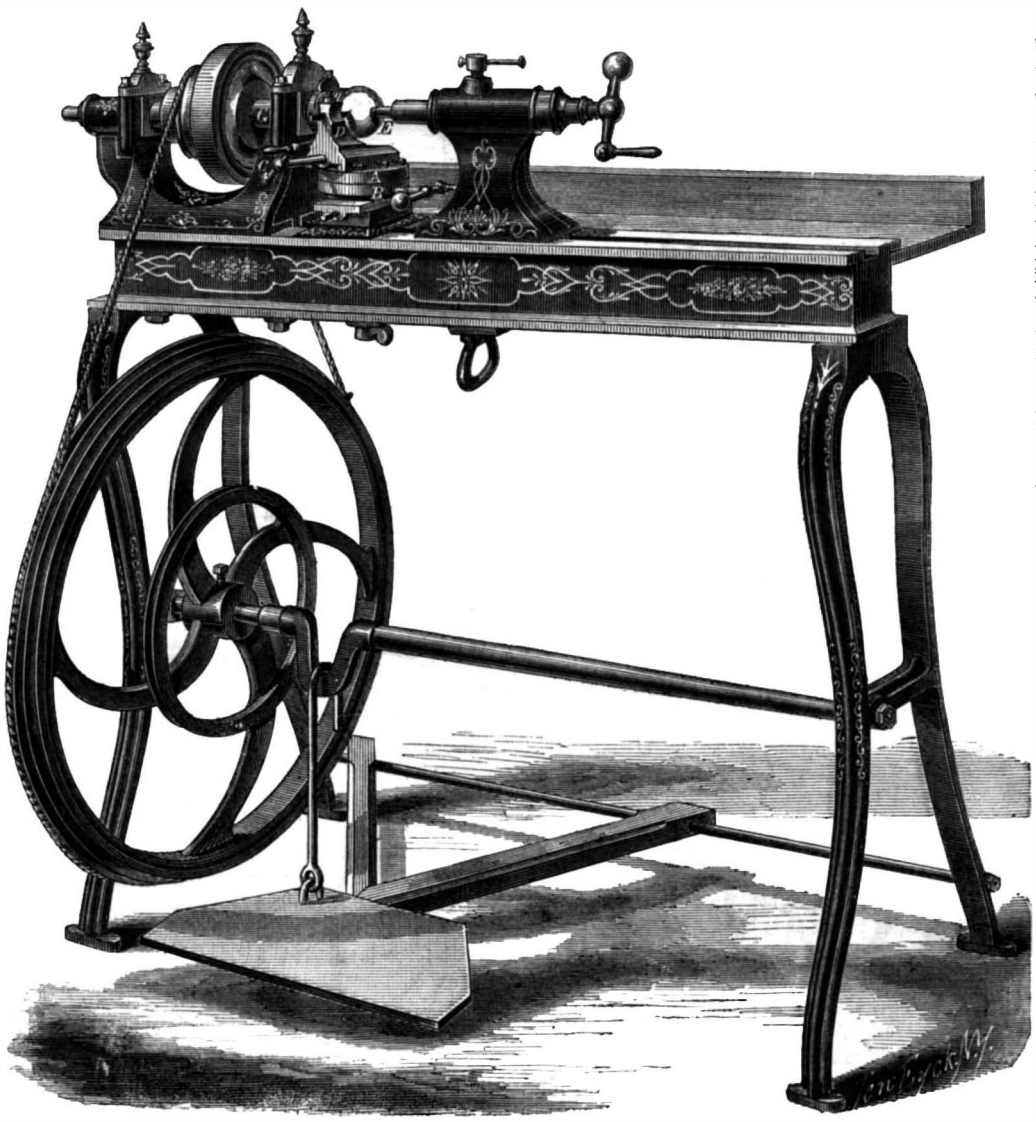
Lathe for Turning Billiard Balls.

Much difficulty has always been experienced in turning spheres or globes, so that they will be perfectly round. Makers of philosophical apparatus have much to contend with in this respect, but turners of billiard balls, in particular, have felt the want of a machine which would turn out a perfect ball, for the skill and experience of the most celebrated player is frustrated by an untried ball, and many games have been lost by reason of the imperfection alluded to. So well is this fact known that a set of balls which are perfectly tried are greatly prized by those who aspire to become more than ordinary players of this fascinating game.

The lathe which is here illustrated has a rest of peculiar construction.—Very many machines have been devised to turn true balls, but most of them have been made on wrong principles, or else so complex that they practically defeated the object in view. The slide rest here illustrated is extremely simple and free from the objection above noted. It is constructed to be operated by hand, and the lathes are driven by steam or the foot, as desired. The peculiarity consists in attaching the upper part, A, of the compound slide rest, to the lower part, B, so that while it has a free movement round its center it has no lateral play, no tendency to jar, and no liability to spring and allow the tool to dig in, or the work to become full of "chatters." By merely grasping the handle, C, the tool stock, D, is carried round the ball in the chuck, so that it is accurately and truly turned to a perfect circle in a short space of time. The chucks which hold the ball itself are also peculiar. If an ordinary center were employed the ball would be injured, and in fact rendered useless for its office A revolving stud, E, is therefore inserted in the spindle, F, fitted so as to turn easily and fit closely. This center is tipped with india-rubber, slightly cupped out so that it has a fair bearing on the ball; when the latter is turned by the chuck, the stud revolves in its spindle and the ball is steadied but not outwardly bruised. The end of the main driving spindle, G, is also made concave so that no wooden chucks are needed; but if they may be required for balls of unusual size, a thread is provided on the spindle, whereby chucks can be affixed as usual.

For manufacturers of all classes, who have work of this kind to execute either in metal or any other substance, for purposes of ornament or utility, this rest will be found a great advantage. It is now used by Messrs. Phelan and Collender in their large manufactory of billiard tables, and they state that they were unable to make a set of balls true before, except at a great expense of time and trouble, whereas, by the use of this rest, they have no difficulty whatever, and every set is guaranteed to be perfectly round. It was patented through the Scientific American Patent Agency on the 8th of September, 1863, by L. A. Johnson; for further information address Messrs. Phelan & Collender, 63 Crosby street, New York, where the lathe may be seen in operation.



LATHE FOR TURNING BILLIARD BALLS.

A Rotary Oil Car.

Recently, says the Philadelphia *Press*, a rotary oil car for the carriage of coal oil brought its first load of petroleum to this city via the Pennsylvania Railroad. This car has been patented by Mr. Lawrence Myers, of this city, and seems to be well adapted to the purpose for which it is intended. Its appearance can probably be understood by imagining two pairs of solid iron wheels, of sixty inches diameter each, connected together by hollow axles of fifty inches diameter, and the whole surmounted by a wooden platform. The oil is let into the hollow axles by means of a hose, and when filled the barrels are closed by valves arranged for the purpose. The expense of barrels and the cost of labor in their shipment is saved by this means. The car we saw has a capacity of 1,000 gallons, or 500 gallons in each cylinder. It is intended to make the cylinders of sixty inches diameter, which will carry 1,400 gallons of oil. In addition to this, the platform may be used for the carriage of other goods.

Ammoniacal Gas as a Motor.

The *Journal of the Society of Arts* states that M. Ch. Tellier has conceived a new and curious application of this gas. He proposes to take advantage of its peculiar properties and use it, in certain cases, as a substitute for steam. The qualities referred to are, its great solubility in water, its easy liquefaction, its power of supplying motive power at the ordinary atmospheric temperature, the capability of its vapor being superheated without too great an increase of the temperature, the possibility of re-collecting it by solution, and the faculty of extracting the latent heat from its vapor, after the latter has been employed, and transmitting it to that which is about to be used, by the simple act of dissolving the gas in water. With a given quantity of ammoniacal gas and three times its weight of water, says the inventor, the whole of the former may be vaporized and used as a motive force with a pressure of eight to ten atmospheres, and the action would be constant because the latent heat required for the vaporization would be constantly reproduced by the caloric released by condensation. So that liquid ammonia is said to supply an instantaneous and practical means of obtaining a motive vapor. With about 22 lbs. of the liquid, we are told, the force of one horse may be obtained for an hour. The inventor does not pretend to place this system in competition with the steam engine, but only where the production of steam would be impracticable and inconvenient. For instance, he says, "an omnibus, drawn by two ammoniacal horses, only need carry about 40 lb. of liquid ammonia and 120 lbs. weight of water. This would supply a simple motor, without smoke or steam, instantaneous in its action, however long and frequent were the stoppages, and with an economy over horses of at least 75 per cent." M. Tellier also recommends his invention for steep inclines on railways, tunnels, mines, and other places where heat cannot be tolerated. We believe that the idea dates back more than twenty years.

It required no less than twenty-seven ships to transport the cotton Sherman captured in Savannah.

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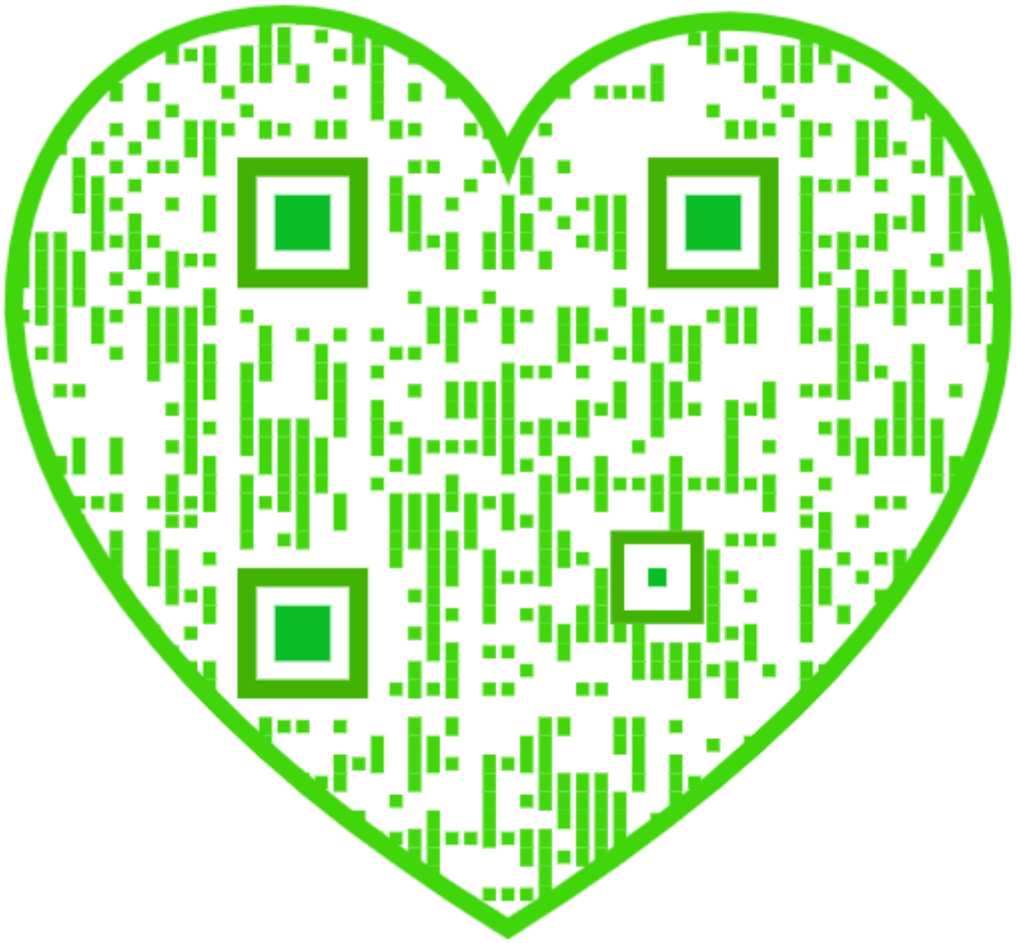

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

[Continued from page 128.]

Reduced to last principles, all difference between mechanical, dynamical and living forces or motions disappears. In every case motion is communicated. No motion is created or conjured up by any process whatever. Wherever energy is manifested it is caused by a disturbance of equilibrium, and this disturbance is caused by other disturbance, and so on to infinity. In other terms, the process of nature is a constant play of energies and movements communicated from one to the other.

Matter as the simple ponderable substance serves only as a vehicle of motion or energy. Energy in itself is simply the power to move a result of the principle of life. The different phenomena, therefore, which attend the display of the various energies of nature's life must be owing to the *scientific spirit* which directs these various movements. All motions are subject to mathematical laws, and consequently the science of mathematics, comprehended in its largest sense, can only supply the key which will unlock these mysterious movements. Human reason cannot be mistaken in this, because *itself* and mathematics are identical.

Luminar motion is a straight-linear, impulsive vibrating motion. It is the primary motion, forming the basis of all other motions. Caloric motion is centroperipheric, involving circular and spiral action, expanding and contracting. The tendency of gravity is towards the center, but its motion results in the ellipse. Magnetic motions, it is believed, are parabolic, and electricity is governed by the hyperbola.

As said before, motion is only communicated. The action of a waterfall may produce a thousand different results by communicating its motion. Wind is raised, vapor ascends, heat and electricity are evolved. By the gravity of the water wheels are turned and all kinds of machinery set in motion. Mechanical action again is converted into friction, heat, electricity and magnetism, etc., etc. Nothing is lost, neither is any thing created. All phenomena are but changes and conversions of the forms of matter, interwoven and interlocked to such a degree that only an infinite mind can comprehend the wonderful action and harmony of the whole.

The finest emotions of the human soul may be called up by mechanical action. A performer sits at the piano and expresses his musical ideas by mechanical action through the instrument. The latter being constructed in accordance with the laws of sound, musical harmony results from this mechanical performance, and it reverberates in the organism of the inner man through the channel of the outer ear. Here is a profound mystery, incomprehensible to a finite understanding. Musical ideas are converted into sound by mechanical action, and vice versa. If no relation existed between mind and matter could such phenomena take place? The truth is plain that all physical energies involve a spiritual principle, and that all mental phenomena involve material action.

There is no such thing as dead matter, neither is there an immaterial spirit. All energies result from spiritual action, outwardly manifested. Spirit and matter are as *cause* and *effect;* they are indissolubly connected, the one cannot exist without the other. Existence is life in degree, comparative life, and involves both, spirit and matter, the positive and the negative; their *polar* relations as *cause* and *effect* produce all energies and all phenomena of nature.

Motion is a translation of space into time and of time into space. Motion is an interweaving of space and time, but is antithetical to both. The principle of motion precedes the reality of space and time. The latter become actual relations through the reality of motion. Motion is the result of a process, and this process again involves motion. Notwithstanding the apparent circular logic of this statement, it is a deep truth, but its further elucidation would be out of place here, as it would lead to a purely metaphysical discussion. The reader is referred to a well digested essay on the origin of motion to Stallo's "Philosophy of Nature."

I will only add here, that the formation of natural matter, or of concrete points, out of the abstract center, is identical with the production of motion itself, and also with the appearance of space and time. Motion, space and time, and matter, form a trinity in unity; they hail from the same spiritual source, and are born out of the same womb, and by one and the same act.

Motion or energy is a primary function of life. The principle of life is uncreated, and so is energy or motion. We can make no distinction between energy and motion, they mutually state each other. Motion or energy being given as the cause, outer matter results as the effect, yet the two state themselves simultaneously. It is a useless task to account for motion or energy on purely material grounds; as much so, as a material explanation of life will always leave the question unanswered. The human mind must accept life as an uncreated principle, as the final cause of existence: natural reason, therefore, can only comprehend its natural relations, but no more. The self evident truth of a final cause, however, must form the basis of every sound philosophy.

The energies of forces are as the square of velocity, and the simple mass. The mass is constant, the velocity may vary, as it is the result of inner energy, or communicated. The so called force of *inertia* is no force at all. *Inertia* is pure passiveness, whether at rest or in motion. Whatever the motion of matter may be, this motion is not the result of *inertia*, but the result of energy. There is no inertia to overcome. When a body is at rest its weight exerts a pressure. Now it is this very weight or pressure which has to be overcome before the body can be set in motion. Gravity has grown out of inertness, but acts only in one direction, towards the center, while inertness acts in no direction because it is simple passiveness. In raising a body vertically its gravity alone results and this is exactly equal to its weight; there is no inertia to overcome. Also when a body is suspended like a pendulum to a string, infinitely long and without any stiffness, in moving that body no inertia results. But motion cannot without conversion be suddenly communicated in *mass* or *quantity*, but only by small increments.

No motion can be maintained by inertia; energy is required because resistance is met everywhere. There is no vacuum; a nothing does not exist; matter is universal, consequently resistance; and wherever is motion there energy is at work.

Matter at rest exerts a pressure towards the center of the earth in consequence of gravitation. This is the force of gravitation arrested. Now the initial velocity of a body at rest will be 1 in the first unit of time, as soon as its support is removed. Pressure, therefore, may be considered a momentum, resulting from an initial velocity of 1. Pressure resulting from simple weight or tension, is a force whose momentum is equal to the weight or tension. To start a railroad train requires more force than to keep it in motion. On a perfect level and with perfect machinery, however, no more power will be consumed to start the train with an initial velocity than is needed to maintain this speed, provided this speed is *infinitely* small. By any increase of speed a portion of the necessary force, in place of communicating motion to the train, will be converted and not rendered useful. The resistance being as the square of speed, a much greater expenditure of force is needed for rapid starting and this great expenditure is usually charged to *inertia*, but erroneously.

Inertness, massiveness and ponderability are all identical. The momentum of a moving body, once acquired, will continue, until it is diminished, either gradually or brought to rest suddenly, by resistance. This momentum being the result of two factors, that is, motion and massiveness, it is plain that without massiveness, there can be no momentum, no force, no motion. This is equally true in a mechanical as well as in a dynamical sense.

Chemical action results from the presence and contact of opposites. In the measure of forces two values have to be distinguished, *volume* and *intensity*. The direct agency in chemical action appears to be electricity. Now in electric tension there are *volume* and *intensity*, corresponding to volume and intensity in the phenomena of sound. Tension is energy, either asserted or moving. The higher the tension of a musical string the greater will be the number of vibrations per second, and the more intense and higher will be the sound. But the volume of motion, its massiveness, depends upon the quantity of matter moved. The volume of force, whether in sound or chemical action, would appear to be in the simple ratio of the mass of matter moved. In chemical action, therefore, this ratio should correspond to the atomic or equivalent number, because this represents the relation of weight or massiveness. In sound it is the mass of the sounding body. On the other hand the intensity of action in either case depends upon tension or rate of motion.

[To be Continued.]

The new English Steampship "City of Boston."

The Inman new screw steamship *City of Boston* will form a valuable addition to the numerous and handsome fleet of vessels belonging to the Liverpool, New York and Philadelphia Steamship Company. For strength, speed and beauty, probably the *City of Boston* cannot be excelled, although she may be equaled. The *City of Boston* is 305 feet in length, 39 feet in breadth, 27 feet 6 inches in depth, and 2,278 tuns, old measurement. The hull is built in six water-tight compartments, each bulkhead running from the keel to the spar deck, and, in effect, guaranteeing the greatest possible security to life should any accident occur at sea such as, under ordinary circumstances, would be likely to cause a ship to sink. To give additional strength the deck is from one end to the other made of iron plates of the best quality manufactured by the Mersey Steel and Iron Company, and upon the plates is laid the ordinary timber deck. The propelling power is supplied by a pair of direct acting trunk engines, of 350 horse power, nominal, the cylinders being 36 inches in diameter, having a three-feet stroke. The boilers are fitted with surface condensers and fired by wings. The screw has a pitch of 24 feet.

To Catch Birds of Prey.

A correspondent of the *Irish Agricultural Review* sends the following ingenious plan for catching predatory birds :—

"Take an egg-shell, stuff it with yellow clay, and stick it on the top of a sharp-pointed stick. Put the stick standing upright in a pool or shallow stream of water. Now place a stone in the water, with only a small portion of it appearing over the surface, and on that place a good rat-trap, in such a position that the bird, to get at the egg, shall have no other place to stand on but the trap. Shake a few dead leaves on the trap, and he will soon have a magpie, if there are many about. Of course, he will turn the unbroken part of the egg-shell up. The clay is only put in to afford a hold for the stick. The success of this method depends very much on changing the trap occasionally, watching it closely, and taking away the birds as they are caught. Magpies are very knowing, and will soon learn what it is, and avoid it. I have killed numbers in this way; both gray-backed crows and magpies."

J. F. Winslow and the Bessemer Process.

Mr. Holley thus dedicates his work on "Ordnance and Armor":—

"JOHN F. WINSLOW, ESQ.—*My Dear Sir* :— The inscription of your name in this work on Ordnance and Armor, is not only gratifying to me on personal grounds, and appropriate from a civilian student in the Art of War, to a civilian ever foremost in improving and developing the *materiel* of war; but it is an expression of that respect, shared by my countrymen at large, for the liberality and enterprise to which, together with the efforts of your associates, we are indebted for the *timely Monitor*, the first home-made steel ordnance, and the introduction of the Bessemer process. I am, dear sir, very respectfully your friend,

"A. L. HOLLEY.

"New York, Sept. 21, 1864."

A MAN came to the Duke of Wellington with a patented article. 'What have you to offer?' 'A bullet-proof jacket, your grace.' 'Put it on.' The inventor obeyed. The Duke rang a bell. An aid-de-camp presented himself. 'Tell the captain of the guard to order one of his men to load with ball cartridge.' The inventor disappeared, and was never seen again near the Horse Guards. No money wasted in trying that invention.

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WROUGHT-IRON GUNS.

Of the three materials which have been used for the construction of heavy ordnance, cast iron, wrought iron, and steel, the one that has proved the least satisfactory is wrought iron. Guns not larger than 68 pounders may be made successfully of wrought iron, as they may of cast iron and other materials, but of all solid wrought iron guns larger than the 68 pounder, but one has exhibited an endurance equal to that of cast iron guns of the same size, while nearly all have burst after a very few rounds. From Holley's work on "Ordnance and Armor," we gather the following particulars in relation to all solid wrought iron guns larger than 68 pounders that have ever been made. It will be observed that the endurance of the 13-inch Horsfall gun, which is considered so extraordinary, is less than that of the 13-inch cast iron gun that was illustrated on page 324, Vol. IX., SCIENTIFIC AMERICAN.

"The most remarkable piece of this manufacture is the 'Horsfall Gun,' fabricated in 1858, and recently made famous in target practice at Shoeburyness.

"This gun is a solid forging of wrought iron, bored out. The trunnions are forged upon a separate ring, which is held in place by a key. The weight is 53,846 lbs, 2·21 oz.; the gun is not rifled.

"Above 8,000 lbs. of powder, and 60,000 lbs. of 282 lb. solid shot have been fired from this gun at various rounds; among others, there have been 90 rounds with 50 lbs. of powder, 21 rounds with 40 lbs., and 6 rounds with 50 lbs., at Shoeburyness; 2 rounds with 80 lbs., at Liverpool; 13 rounds with 20 to 45 lbs., and 50 rounds with 30 lbs. With 45 lbs. of powder, a number of shells were fired loaded with lead to weigh 310 and 318 lbs."

The gun was then examined and seven cracks were discovered in the bore, varying from $\frac{1}{10}$ of an inch to 13¾ inches in depth.

"After the gun had endured these tests, and had been presented to the British Government by the makers, it was left unprotected on the beach of Portsmouth. By renewed exertions, the Merser Company at last obtained permission to fire it at the Warrior target. It was found nearly buried with shingle and much injured by rust. Having been taken to Shoeburyness, it fired several rounds of 282 lb. shot with 74 lbs. of powder, with terrific effect at short range. The cost of such guns in England, would be about $12,500.

"The Prince Alfred gun, shown in the great Exhibition of 1862, was forged hollow, on a plan patented by Lt.-Col. Clay, of the Mersey Iron Works, and intended principally to overcome the defect of unequal shrinkage and initial strain and rupture. Broad plates, bent to the proper curve, were laid and welded upon a barrel made of rolled staves."

It has a caliber of 10 inches, and weighs 24,094 lbs.

"This gun has been fired but twice, and then as a smooth-bore; first, with a 140 lb. shot and 20 lbs. of powder, and, second, with the same shot and 30 lbs. of powder."

"The 12-inch wrought iron gun, in the Brooklyn Navy Yard, was forged like the Horsfall gun, by the Mersey Iron Works, in 1845, to replace the Stockton gun. Its dimensions are:—total length, 14 feet 1 in.; diameter over the chamber, 28 in.; length of bore, 12 feet; diameter of bore, 12 in.; weight, 16,700 lbs. It was received after the bursting of the Stockton gun, of which it is a copy, in shape, and has never been mounted for service. It has been fired once with two 224 lb. shot and 45 lbs. of powder."

"The British Government has ordered several guns of 6½ inches bore, to be forged hollow, like the Alfred gun. One of these, weighing 7,282 lbs., was fired 10 rounds with 68 lb. 10 oz. shot; 10 rounds with 136 lb. 8 oz. shot; 10 with a 204 lb. shot; 10 with a 273 lb. shot; 10 with 340 lb. 8 oz. shot; 10 with 410 lb. shot; and 10 with a 476 lb. shot. At the 70th round the gun burst into eight pieces. Subsequent experiments on the metal gave a tensile strength of 45,359 lbs. per sq. inch."

Three 12-inch wrought iron guns were made some years since, under the direction of Commodore Stockton, for the U. S. Government.

"The first, called the 'Oregon', gun, was forged in England. After considerable use with charges of 20 to 30 lbs. of powder and 216-lb balls, it cracked through the reinforce, but was hooped and fired aftewards without injury. This gun is now in the Navy Yard at Philadelphia.

"The 'Peacemaker' was forged in the United States, by Messrs. Ward & Co."

The gun burst on board the United States steamer *Princeton*, after a few discharges, killing several members of President Tyler's cabinet. The failure of these large wrought iron guns is doubtless the result of imperfect welding of the several bars of which they were formed. It is claimed that this difficulty can be overcome by the Ames process of constructing cannon, which consists in welding successive coils together so as to build up the gun lengthwise. We published in our last volume two accounts of trial of one of these guns, but in neither were the particulars of the caliber and weight of the piece given. It was, however, stated that the gun was fired 700 rounds, with shot and shell ranging from 104 to 151½ lbs. in weight, and with various charges of powder, reaching as high as 30 pounds. If these statements are correct, the Ames gun has exhibited an endurance far beyond that of any other wrought iron gun yet constructed by the plan of solid forging; and if guns can be made uniformly of this strength, wrought iron will enter into competition with steel as the material for heavy ordnance. We should suppose, however, that the great difficulty of handling, forging and welding these enormous masses of iron would make wrought iron guns more costly than those of steel, which can be cast in the proper form, while the steel guns would be somewhat superior in strength and durability.

BOOKS AND PUBLICATIONS.

BURGH'S LAND AND MARINE ENGINES AND BOILERS.—The proportions of the several parts of engines and boilers is a matter of much importance, and we are frequently in receipt of letters asking advice on this subject. The work in question contains many rules for finding the sizes of different parts by ordinary arithmetical calculations, and cannot fail to be useful to mechanics and constructors of steam machinery. Rules are also given for obtaining the radius of the link used in link motion, for determining the position of the eccentric with relation to the crank, the size of the feed pump, steam ports, and, in short, every detail of any importance that is necessary has received attention.

Mr. N. P. Burgh, the author, has been concise with his rules but diffuse in his observations on steam engines. He says:—"The London engineers are undoubtedly the *ne plus ultra*, in every sense of the word, relative to marine engines." And again on page 31:—"The rules given for the feed pump are generally both abstruse and obtuse, thus confounding the uninitiated with perplexing calculations having no reference to the cause of requirement." What is an obtuse rule?

Henry Carey Baird, No. 406 Walnut street, Philadelphia, Pa., is the publisher of this work, and it can be had free by mail by addressing him at that place.

WOODWARD'S COUNTRY HOMES.—This is a book of 166 pages, and contains a large number of very chaste and beautiful designs for snug, comfortable homes. We have the neat laborer's cottage, the gardener's cottage, the farm cottage, design for a rural church, design for ice-house, school-house, carriage-house and stable, old house remodeled, chapter on gates, together with several designs for the more expensive class of suburban residences. The chapter on what is termed balloon framing with the clear diagrams is worth alone to country builders the whole cost of the book, which we understand to be $1 50, sent by mail.

The work is published by Messrs. Geo. E. & F. W. Woodward, No. 37 Park row, office adjoining our own.

We have long known these gentlemen as architects, and we regard them as among the most reliable and skilful men in the profession. Their new work on Country Homes ought to be in the hands of every man that builds or contemplates building a home.

TRANSACTIONS OF THE AMERICAN INSTITUTE FOR 1863.—The three societies of the American Institute—the Horticultural, Farmers' Club, and the Polytechnic Association—are the means of disseminating a great deal of useful information on various subjects.

These meetings are held in room No. 24 of the Cooper Union—the Polytechnic every Thursday evening throughout the year, when chemistry applied to the arts and sciences, petroleum, mechanics, machines, steam and hydraulic engines, and all that relates to American industry generally are discussed at greater or less length.

The proceedings are stenographically reported, and are afterward recorded in the minutes of the Institute, being finally published in book form.

The volume for 1863 is before us, and is interesting to mechanics and others by reason of the excellent reports and superb engravings which it contains. The Wheeler & Wilson button-hole machine, the Elliptic machine, and Root's steam engine are illustrated and fully described, while matters relating to the farmer's interest are also to be found.

This work can be obtained by addressing J. W. Chambers, Secretary of the American Institute.

How thin Steel can be Rolled.

Several interesting communications on the subject of thin rolled iron having been published, the Birmingham *Post* gives an account of an experiment in rolling steel. It seems to us that in this case the experiment was continued beyond the limits of endurance, for the texture was destroyed in the operation.

"To the lively competition in iron rolling, excited by the receipt of an iron letter from Pennsylvania, we have now to add an interesting note on the degree of thinness to which steel can be rolled. The samples we have seen were rolled at Mr. Gillott's works, and have been sent to Messrs. Holtzapffell and Co, to be measured by their micrometer gage. Messrs. Holtzapffel and Co. say:—'We have carefully measured three sheets of steel, and find the average thickness to be one eighteen-hundredth part of the English standard inch. The thinnest tissue paper we have been able to purchase at the stationers' shops measures one twelve-hundredth part of an inch; those samples of cast rolled steel show very fine holes and have a porous surface, but still are perfectly smooth and easy to write on, and the porosity can only be seen when they are held up to a good light. It is believed that steel may be rolled still finer when other experiments are made.'"

What is an Inch of Rain?

The late weekly return of the British Registrar-General gives the following interesting information in respect to rain fall:—"Rain fell in London to the amount of 0·43 inches, which is equivalent to forty-three tuns of rain per acre. The rain fall during last week varied from thirty tuns per acre in Edinburgh, to two hundred and fifteen tuns per acre in Glasgow. An English acre consists of 6,272,640 square inches; and an inch deep of rain on an acre yields 6,272,640 cubic inches of water, which at 277,274 cubic inches to the gallon, makes 22,622·5 gallons; and, as a gallon of distilled water weighs ten pounds, the rainfall on an acre is 226,225 pounds avoirdupois; but 2,240 pounds are a tun, and consequently an inch deep of rain weighs 100·993 tuns, or nearly one hundred and one tuns per acre. For every one hundredth of an inch a tun of water falls per acre." If any agriculturist were to try the experiment of distributing artificially that which nature so bountifully supplies, he would soon feel inclined to "rest and be thankful."

A PIECE OF IMPERTINENCE.—A letter has just been received at the Navy Department from Sir William Armstrong, the well known English gunmaker, in which he urges this Government to imitate the example of France and Russia, by manufacturing his guns. To this piece of scientific impertinence, Capt. Wise of the Ordnance Bureau has written a caustic reply, in which he tells Sir William that the Armstrong guns captured at Fort Fisher afford us the means of testing their supposed efficiency. Upon these guns was found an inscription, setting forth that they were a present from Sir William Armstrong to Jeff Davis.

ENGLISH jewellers are now setting small Brazilian beetles of green and gold color, which are found in immense numbers at Bahia, in gold and silver to form bracelets, brooches, etc.

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REPORT OF THE COMMITTEE OF THE FRANKLIN INSTITUTE ON SCREW THREADS.

The Special Committee on a Uniform System of Screw Threads, Etc., presented the following report:—

That in the course of their investigations they have become more deeply impressed with the necessity of some acknowledged standard, the varieties of threads in use being much greater than they had supposed possible; in fact the difficulty of obtaining the exact pitch of a thread not a multiple or sub-multiple of the inch measure is sometimes a matter of extreme embarrassment.

Such a state of things must evidently be prejudicial to the best interests of the whole country, a great and unnecessary waste is its certain consequence, for, not only must the various parts of new machinery be adjusted to each other in place of being interchangeable, but no adequate provision can be made for repairs, and a costly variety of screwing apparatus becomes a necessity. It may reasonably be hoped that should a uniformity of practice result from the efforts and investigations now undertaken, the advantages flowing from it will be so manifest as to induce reform in other particulars of scarcely less importance.

Your Committee have held numerous meetings for the purpose of considering the various conditions required in any system which they could recommend for adoption. Strength, durability, with reference to wear from constant use and ease of construction, would seem to be the principal requisites in any general system, for, although in many cases, as, for instance, when a square thread is used, the strength of the thread or bolt are both sacrificed for the sake of securing some other advantage, yet all such have been considered as special cases, not affecting the general inquiry. With this in view, your Committee decided that threads having their sides at an angle to each other must necessarily more nearly fulfil the first condition than any other form; but what this angle should be must be governed by a variety of considerations, for it is clear that if the two sides start from the same point at the top, the greater the angle contained between them the greater will be the strength of the bolt; on the other hand, the greater this angle, supposing the apex of the thread to be over the center of its base, the greater will be the tendency to burst the nut, and the greater the friction between the nut and the bolt, so that if carried to excess the bolt would be broken by torsional strain rather than by a strain in the direction of its length. If, however, we should make one side of the thread perpendicular to the axis of the bolt, and the other at an angle to the first, we should obtain the greatest amount of strength, together with the least frictional resistance; but we should have a thread only suitable for supporting strains in one direction, and constant care would be requisite to cut the thread in the nut in the proper direction to correspond with the bolt; we have consequently classed this form as exceptional, and decided that the two sides should be set at an angle to each other and form equal angles with the base.

The general form of the thread having been determined upon the above considerations, the angles which the sides should bear to each other has been fixed at 60°, not only because this seems to fulfil the conditions of least frictional resistance, combined with the greatest strength, but because it is an angle more readily obtained than any other, and it is also in more general use. As this form is in common use almost to the exclusion of any other, your Committee have carefully weighed its advantages and disadvantages before deciding to recommend any modification of it. It cannot be doubted that the soft thread offers us the simplest form, and that its general adoption would require no special tools for its construction, but its liability to accident, always great, becomes a serious matter upon large bolts, while the small amount of strength at the sharp top is a strong inducement to sacrifice some of it for the sake of better protection to the remainder; when this conclusion is reached, it is at once evident a corresponding space may be filled up in the bottom of the thread, and thus give an increased strength to the bolt, which may compensate for the reduction in strength and wearing surface upon the thread. It is also clear that such a modification, by avoiding the fine points and angles in the tools of construction, will increase their durability; all of which being admitted, the question comes up what form shall be given to the top and bottom of the thread? for it is evident one should be the converse of the other. It being admitted that the sharp thread can be made interchangeable more readily than any other, it is clear that this advantage would not be impaired if we should stop cutting out the space before we had made the thread full or sharp, but to give the same shape at the bottom of the thread would require that a similar quantity should be taken off the point of the cutting tool, thus necessitating the use of some instrument capable of measuring the required amount, but when this is done the thread having a flat top and bottom can be quite as readily formed as if it was sharp. A very slight examination sufficed to satisfy us that in point of construction, the rounded top and bottom presents much greater difficulties, in fact all taps and screws that are chased or cut in a lathe required to be finished or rounded by a second process. As the radius of the curve to form this must vary for every thread, it will be impossible to make one gage to answer for all sizes and very difficult, in fact impossible, without special tools to shape it correctly for one.

Your Committee are of opinion that the introduction of a uniform system would be greatly facilitated by the adoption of such a form of thread as would enable any intelligent mechanic to construct it without any special tools, or if any are necessary, that they shall be as few and as simple as possible, so that although the round top and bottom presents some advantages when it is perfectly made, as increased strength to the thread and the best form to the cutting tools, yet we have considered that these are more than compensated by ease of construction, the certainty of fit and increased wearing surface offered by the flat top and bottom, and therefore recommend its adoption. The amount of flat to be taken off should be as small as possible, and only sufficient to protect the thread; for this purpose one-eighth of the pitch would seem to be ample, and this will leave three-fourths of the pitch for bearing surface. The considerations governing the pitch are so various that their discussion has consumed much time.

As in every instance the threads now in use are stronger than their bolts, it became a question whether a finer scale would not be an advantage, it is possible that if the use of the screw thread was confined to wrought iron or brass, such a conclusion might have been reached, but as cast iron enters so largely into all engineering work, it was believed finer threads than those in general use might not be found an improvement, particularly when it was considered that so far as the vertical hight of thread and strength of bolt are concerned, the adoption of a flat top and bottom thread was equivalent to decreasing the pitch of a sharp thread 25 per cent, or, what is the same thing, increasing the number of threads per inch 33 per cent. If finer threads were adopted they would require also greater exactitude than at present exists in the machinery of construction, to avoid the liability of overriding, and the wearing surface would be diminished; moreover, we are of opinion that the average practice of the mechanical world would probably be found better adapted to the general want than any proportions founded upon theory alone.

We have taken some pains to ascertain what the proportions in use are, and submit the following, as being in our judgment a fair average, viz:—

Diam. of Bolt.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛	1¼
Threads per in.	20	18	16	14	13	12	11	10	9	8	7	7
Diam. of Bolt.	1⅜	1½	1⅝	1¾	1⅞	2	2¼	2½	2¾	3	3⅛	3⅜
Threads per in.	6	6	5½	5	5	4½	4½	4	4	3½	3½	3¼
Diam. of Bolt.	3⅜	4	4⅛	4½	4¾	5	5⅛	5⅛	5⅜	6	...	...
Threads per in.	3	3	2⅞	2¾	2⅝	2½	2⅜	2⅜	2⅜	2¼	...	...

The proportions for bolt-heads and nuts, as given in most of our books of reference, are believed to be larger than necessary, and all are tabulated, necessitating constant reference, a simple formula would probably induce a uniform practice, but as most of the sizes in common use are made by machinery and also by hand, it is believed the bolt-head and nut for finished work should be made somewhat smaller than for rough, to avoid the confusion that would ensue if the necessary allowance for dressing should be made upon work intended for finishing.

In conclusion, therefore, your Committee offer the following:—

Resolved, That the Franklin Institute of the State of Pennsylvania recommend for general adoption by American Engineers, the following forms and proportions for screw threads, bolt-heads and nuts, viz.—

That screw threads shall be formed with straight sides at an angle to each, other of 60°, having a flat surface at the top and bottom equal to one-eighth of the pitch. The pitch shall be as in the preceding table.

The distance between the parallel sides of a bolt-head and nut for a rough bolt shall be equal to one-and-a-half diameters of the bolt, plus one-eighth of an inch. The thickness of the heads for a rough bolt shall be equal to one-half the distance between its parallel sides. The thickness of the nut shall be equal to the diameter of the bolt. The thickness of the head for a finished bolt shall be equal to the thickness of the nut. The distance between the parallel sides of a bolt-head and nut, and the thickness of the nut shall be one-sixteenth of an inch less for finished work than for rough.

Resolved, That a copy of these resolutions be forwarded to the Quarter Master General, Chief of the Bureau of Steam Engineering of the Navy, and the Chief of the Bureau of Ordnance for the Army and Navy, and Chiefs of the Engineer and Military R.R. Corps, and the Supt. and M.M. of R.R. Co.'s, requesting them to use their influence to promote the adoption of a uniform system of screw threads, bolt-heads and nuts, by requiring all builders on new contracts to conform to the proportions recommended.

Resolved, That a copy of these resolutions be also sent to all Mechanical and Engineering Associations or Institutes, and the principal Machine and Engine Shops in the country, with a request that they will use their influence in the proposed system.

Resolved, That this Committee be now discharged.

WM. B. BEMENT, firm of Bement & Dougherty.
C. T. PARRY, supt. Baldwin's Locomotive Works.
J. VAUGHAN MERRICK, firm of Merrick & Sons.
JOHN A. TOWNE, firm of I. P. Morris, Towne & Co.
COLEMAN SELLERS, Eng. Wm. Sellers & Co.
B. H. BARTOL, supt. Southwark Foundery.
EDWARD LONGSTRETH, foreman Baldwin's Loc. Works.
JAMES MOORE, firm of Matthews & Moore.
WM. SELLERS, firm of Wm. Sellers & Co.
ALGERNON ROBERTS, of the Pencoyd Iron Works.

Letter from Mr. Mushet.

We find the following in the London *Engineer*:—

THE BESSEMER PROCESS.

SIR:—When Mr. Bessemer read his celebrated paper at the meeting of the British Association at Cheltenham, in 1856, I saw clearly where his difficulties would arise, and that he could not, by his process, produce either iron or steel of commercial value. A few days after the reading of the paper, I received specimens of Bessemer metal. Some of these were cold short and some were cold tough; but all were alike red short at any heat under the welding heat. They were ductile enough when worked at a high welding heat; but as soon as the temperature was lowered, the bars broke off or crumbled like heated cast iron. I at once saw that, by melting them again with manganesic pig iron, or spiegeleisen, they would form good steel or iron, according to the dose of manganesic pig added to them. Late that night it occurred to me that, by mixing the already melted Bessemer metal with melted spiegeleisen, the process could at once and simply be rendered successful.

I immediately lighted a fire in a small steel melting furnace, and placed in the furnace two crucibles, one containing eight ounces of Bessemer metal, and the other one ounce of spiegeleisen. When the contents of the crucibles were melted I withdrew the crucibles, and poured the melted spiegeleisen into the melted Bessemer metal; I then emptied the mixture into a small ingot mold; the ingot was piped, and had all the characteristics of an ingot of excellent cast steel. I next heated the ingot to a fair cast-steel heat. Mrs. Mushet held it in a pair of tongs, and I drew it out with a sledgehammer into a flat bar. I heated this bar, and then twisted it in a vise, at a white heat, red heat, and black red heat; and it remained perfectly clear and sound in the edges, without a trace of red shortness. I now doubled and welded the bar, and forged it into a chisel, which I tempered and tried severely for a flat chisel and diamond point, upon hard cast iron. The chisel stood the test well, and was, in fact, welding cast steel, worth, at the least, 42s. per cwt. I saw now that I had made a discovery even more valuable than that of the Bessemer process; for, although the Bessemer process was not of any value apart from my invention, on the other hand, my invention could be applied extensively in the manufacture of pot-melted steel. Less conversant with the world than with matters relating to iron and steel, I confided in certain parties of great wealth and influence in the iron trade, believing that I had to deal with men of honor and integrity, incapable of a mean and base action. On this score I gained experience, which cost me my patents, but taught me a lesson not easily forgotten. I placed my patents in the hands of parties who promised to carry them out, and see justice done to

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me. I now proceeded to extend the scale of operations as follows:—

I charged sixteen melting pots with 44 lb. each of Bessemer metal, and when this was melted I poured into each pot 3 lb. of melted spiegeleisen. I then poured the contents of the sixteen melting pots into a large ingot mold, and the ingot thus made was sent to the Ebbw Vale Ironworks, and then rolled at one heat into a double-headed rail. This rail was sent to me for inspection, and to be by me forwarded to Mr. Ellis at Derby station, to be laid down there at a place where iron rails had to be changed once in three months.

When the rail, which was very perfect, came to me, it was so thickly studded with the words "Ebbw Vale Iron Co," that no space remained to squeeze in the words "Robert Mushet."

I sent the rail to Derby, and I read a public statement made by Mr. Adams of the Ebbw Vale, some time ago, to the effect that this rail remained as perfect as ever, after six years wear and tear from the passage over it of 700 trains daily. That was the first Bessemer rail.

I next charged twenty melting pots with 46 lb. each of Bessemer metal, and when melted I poured into each pot 2 lb. of melted spiegeleisen, and then emptied the contents of all the melting pots into one ingot mold. The ingot was rolled at two heats, at Ebbw Vale Ironworks, into a bridge rail, which would have been about thirty feet long, but the engine was overpowered when the rail was in the last groove and stopped, so that the rail had to be cut in two. One piece, sixteen feet long, was exhibited in the office of an influential Iron Company in London, as the produce of the Uchatius or atomic process of steel making.

Let us charitably suppose that the gentlemen who exhibited this rail were at the time laboring under some mental hallucination. To enable me to specify my patent, I was very generously furnished by Mr. S. H. Blackwell of Dudley with a blowing machine capable of sustaining a pillar of blast of 10 lb. per square inch. With this blowing apparatus and some small furnaces operating upon from 60 lb. to 600 lb. melted cast iron, I experimented for six months, and satisfied myself that the whole affair was as simple, and, indeed, far more simple, than the ordinary foundery process for melting and casting iron. I made cast steel direct from the Bessemer, of a quality fairly valued at £56 per tun, but which apparently has not been accomplished subsequently by others who have adopted the process. I am well aware of the cause of the failure and of many difficulties that beset, and will still continue to beset, this process, until it is reduced to the simple first principles which govern it. I do not in the least grudge to Mr. Bessemer the £100,000 per annum which my invention is enabling him to realize. It was not by any fault of his that my patent was lost; but I wish, for his own sake, that he had manfully acknowledged the source of his success, and had been content with the amply sufficient merit of his own inventions and perseverance, without endeavoring tacitly to monopolize the credit due to me and to himself jointly. R. Mushet.

Cheltenham, Jan. 23, 1865.

COUNT RUMFORD.

Professor Youmans, in the introduction to his collection of treatises on the Correlation of Forces gives this sketch of Count Rumford:—

"Benjamin Thompson was born at Woburn, Mass., in 1753. He received the rudiments of a common school education, became a merchant's apprentice at twelve, and subsequently taught school. Having a strong taste for mechanical and chemical studies, he cultivated them assiduously during his leisure time. At seventeen he took charge of an academy in the village of Rumford, (now Concord), N. H., and in 1772 married a wealthy widow, by whom he had one daughter. At the outbreak of revolutionary hostilities he applied for a commission in the American service, was charged with toryism, left the country in disgust and went to England. His talents were there appreciated, and he took a responsible position under the government, which he held for some years.

"After receiving the honor of knighthood he left England and entered the service of the Elector of Bavaria. He settled in Munich in 1784, and was appointed aide-de-camp and chamberlain to the Prince. The labors which he now undertook were of the most extensive and laborious character, and could never have been accomplished but for the rigorous habits of order which he carried into all his pursuits. He reorganized the entire military establishment of Bavaria, introduced not only a simpler code of tactics, and a new system of order, discipline and economy among the troops and industrial schools for the soldiers' children, but greatly improved the construction and modes of manufacture of arms and ordnance. He suppressed the system of beggary which had grown into a recognized profession in Bavaria, and become an enormous public evil—one of the most remarkable social reforms on record. He also devoted himself to various ameliorations, such as improving the construction and arrangement of the dwellings of the working classes, providing for them a better education, organizing houses of industry, introducing superior breeds of horses and cattle, and promoting landscape gardening, which he did by converting an old abandoned hunting-ground near Munich into a park, where after his departure, the inhabitants erected a monument to his honor. For these services Sir Benjamin Thompson received many distinctions, and among others was made count of the holy Roman Empire. On receiving this dignity he chose a title in remembrance of the country of his nativity, and was thenceforth known as Count of Rumford.

"His health failing from excessive labor and what he considered the unfavorable climate, he came back to England in 1798, and had serious thoughts of returning to the United States. Having received from the American government the compliment of a formal invitation to revisit his native land, he wrote to an old friend requesting him to look out for a 'little quiet retreat' for himself and daughter in the vicinity of Boston. This intention, however, failed, as he shortly after became involved in the enterprise of founding the Royal Institution of England.

"There was in Rumford's character a happy combination of philanthropic impulses, executive power in carrying out great projects, and versatility of talent in physical research. His scientific investigations were largely guided and determined by his philanthropic plans and public duties. His interest in the more needy classes led him to the assiduous study of the physical wants of mankind, and the best methods of relieving them; the laws and domestic management of heat accordingly engaged a large share of his attention. He determined the amount of heat arising from the combustion of different kinds of fuel, by means of a calorimeter of his own invention. He reconstructed the fireplace, and so improved the methods of heating apartments and cooking food as to produce a saving in the precious element, varying from one-half to seven-eights of the fuel previously consumed. He improved the construction of stoves, cooking ranges, coal grates and chimneys; showed that the non-conducting power of cloth is due to the air enclosed among its fibers, and first pointed out that mode of action of heat called *convection;* indeed he was the first clearly to discriminate between the three modes of propagating heat—radiation, conduction and convection. He determined the almost perfect non-conducting properties of liquids, investigated the production of light, and invented a mode of measuring it. He was the first to apply steam generally to the warming of fluids and the culinary art; he experimented upon the use of gunpowder, the strength of materials, and the maximum density of water, and made many valuable and original observations upon an extensive range of subjects.

"Prof. James D. Forbes, in his able Dissertation on the recent Progress of the Mathematical and Physical Sciences, in the last edition of the 'Encyclopedia Britannica,' gives a full account of Rumford's contributions to science, and remarks:—

"'All Rumford's experiments were made with admirable precision, and recorded with elaborate fidelity, and in the plainest language. Every thing with him was reduced to weight and measure, and no pains were spared to attain the best results.

"'Rumford's name will ever be connected with the progress of science in England by two circumstances: first, by the foundation of a perpetual medal and prize in the gift of the council of the Royal Society of London, for the reward of discoveries connected with heat and light; and, secondly, by the establishment in 1800 of the Royal Institution in London, destined, primarily, for the promotion of original discovery, and, secondarily, for the diffusion of a taste for science among the educated classes. The plan was conceived with the sagacity which characterized Rumford, and its success has been greater than could have been anticipated. Davy was there brought into notice by Rumford himself, and furnished with the means of prosecuting his admirable experiments. He and Mr. Faraday have given to that institution its just celebrity with little intermission for half a century.'

"Leaving England, Rumford took up his residence in France, and the estimation in which he was held may be judged of by the fact that he was elected one of the eight foreign associates of the Academy of Sciences.

"Count Rumford bequeathed to Harvard University the funds for endowing its professorship of the Application of Science to the Art of Living, and instituted a prize to be awarded by the American Academy of Sciences, for the most important discoveries and improvements relating to heat and light. In 1804 he married the widow of the celebrated chemist Lavoisier, and with her retired to the villa of Auteuil, the residence of her former husband, where he died in 1814."

A New Electro-Magnet.

Is it possible that our present electro-magnet is to what it might be, what the cog wheel of the early railway engineers was to the present smooth one? For after our electricians have for so many years been exhausting their ingenuity to accomplish a certain object, M. Du Moncel—no mean authority in such matters—comes forward and declares that the object gained by that ingenuity is worse than useless. An electro-magnet may be briefly defined to be a cylinder of iron covered with a helix of wire; very powerless is the iron if no current is passing through the wire; very powerful is it—witness the Royal Institution magnet, and the one in Paris which is covered with 20,000 ft. of wire and lifts a weight of three tuns—while a current passes. We may say, therefore, that the power of the magnet depends on the wire; and it has always been considered necessary that the wire, thin or thick, according to the work to be done or the strength of the current used, must be most carefully covered with an insulated substance. So we have wires covered with silk, with cotton, india-rubber, and varnishes of different kinds. And this equally in the electro-magnets used for experiments as in those used for the ten thousand purposes in which electricity is now being daily employed; indeed, we may almost say that electricity works by electro-magnets. Some time ago, M. Carlier, an electrician in Paris, asked himself the question—Is this covering necessary? And he very properly set to work to make an electro-magnet with uncovered wire to answer the question. M. Du Moncel, in a communication to the Paris Academy, on the 9th inst., declares that the answer thus given is so extraordinary, and the power of the uncovered electro-magnet so great, that he can scarcely believe his own experiments. Not only can these new magnets produce all the effects of attraction of the covered ones, but the effects in some cases are more than doubled. Let us produce M. Du Moncel's figures. A bar of iron 4½ centimeters long, and 7 millimeters in diameter, covered with a single spiral of wire 0.277 millimeters in diameter, with two small Bunsen's elements, sustained a weight of 3·9 kilogrammes; covered, it could only support 2·4 kilogrammes. A larger magnet, covered with twelve coats of wire, held up 940 grammes; with covered wire it could only support 540 grammes. The effects of distant attraction were even more favorable. At a distance of one millimeter, and with a Daniell's pile of twenty-eight elements, the weights attracted were as follows:—

Circuit.	New Magnet.	Old Magnet.
0 kilometres	83	12
10 ,,	12	3
20 ,,	4	0

The requisite condition to obtain these effects is that the different "coats" of wire shall be separated from each other by a piece of paper, and that the interior of the bobbins, whether in wood or copper, should be

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covered also with an isolated substance. The advantages of this system are obvious, the first being reduced cost of the magnets. Then we have greater effects, which is tantamount to a reduction of size—and consequently another reduction of the cost. The "extra currents" being also done away with, a more prompt movement of the armatures results, and therefore greater usefulness in induction coils. In telegraphic instruments they present the additional advantage of remaining unaffected by lightning. M. Du Moncel remarks, by way of explanation—explanation is easier than prediction—"I consider that in magnets of the new construction the surface of contact of the spirals between themselves represents, in fact, a linear spiral, of which the points furnish derivations. We can easily imagine that the electric flux provoked by these derivations can only be produced by furnishing a series of superposed currents circulating through all the folds of the metallic helix, by reason of the resistance to the passage from one spiral to the other. Now, if the primitive current circulating through the helix is weakened by these derivations, it is reinforced by the derived and superposed current, which, in over exciting the pile, furnishes at last a more energetic current. Besides it must be borne in mind that the direct current which results from the derivations, and which passes through the spirals towards the axis, ought to be derived from them, and as it is not enfeebled by its passage, it should augment the intensity of the current which flows through it." Lastly, the quantity of uncovered wire which can be used for a given magnet is greater than that of covered. We shall, doubtless, at once hear of some experiments disproving or supporting M. Du Moncel's; in the latter case the method he points out should be immediately acted upon.—*Reader.*

The Origin of the Locomotive.

In the matter of priority of invention in, or rather of attempts at, land propulsion by steam, the French may well claim to be our *devanciers*, and we do not think that any true Englishman will be inclined to grudge them this honor. The first steam carriage seems to have been made by a Frenchman, Cugnot, in 1760, that same marvellous year which witnessed the birth of Napoleon I., Wellington, Humboldt, Mehemet Ali, Lord Castlereagh, Sir E. I. Brunel, Cuvier, and the first patent of Arkwright, the first patent of Watt, as also some other events almost as great in their eventual influence on the present era. An engine made by Cugnot is still in existence in the Conservatoire des Arts et Metiers at Paris. It has a copper boiler, very much like a common kettle without the handle and spout, furnishing with steam a pair of 13-in. single-acting cylinders. The engine propels a single driving wheel, which is roughened on its periphery. Altogether, this engine bears considerable testimony to the mechanical genius of its inventor. It was unsuccessful, having got overturned once or twice on the very bad roads then existing in France, and it was put on one side. It is stated, however, that arrangements were made, in 1801, to put it to work in the presence of Napoleon Bonaparte. The departure, however, of Napoleon for Egypt, prevented the trial—a circumstance which recalls Fulton's subsequent unsuccessful negotiations with Napoleon for aid in attempting marine propulsion by steam. Watt, then, in 1784, patented a locomotive engine, the boiler of which was to be "of *wood*," hooped like a beer barrel. Watt, however, had not much faith in steam carriages, and he objected to the attempts made in this direction, in 1784, by William Murdoch, his very able assistant. The miniature engine made by Murdoch in that year is still carefully preserved at Soho. Careful and elaborate researches, such as those lately made by Mr. Zerah Colburn, into the history of the locomotive, seem to more and more confirm existing impressions as to the great part done by Trevethick in the introduction of the locomotive engine.—*Builder.*

Chloride of Barium against Boiler Incrustation.

The applicability of chloride of barium for removing and preventing boiler incrustations of sulphate of lime is not so well known as it should be. Recent experiments made in Hanover show that it may be used with advantage in many cases. Chloride of barium decomposes the sulphate of lime present in many waters, forming chloride of lime, which remains in solution, and sulphate of barium which precipitates in the form of powder, producing a yellowish white slush at the bottom of the boiler. The chloride of barium should always be present in excess in the boiler, which is the case when no further turbidity is produced on adding some to a sample of the water. The high specific gravity of the sulphate of barium, which is double that of any lime salt, requires the use of a shovel for removing the slush, but also prevents the possibility of any of the particles being carried up by the steam. When the boiler is stopped for cleansing purposes, the water should not be entirely drawn off until cold, the slush becoming otherwise dried and hardened by the heat. The water may also be purified previous to use, time being allowed for the settling down of the turbidity. Unlike certain other chemicals frequently employed, chloride of barium has not the least injurious effect upon iron.—*Engineer.*

Various Sources of Vegetable Oils.

A very large white pea is grown near Shanghae, in China from which oil is extracted for burning. So extensively is this article used that from Shanghae alone £2,000,000 worth is yearly distributed over China. This leguminous plant is called teuss. There is another Chinese production called the tea oil, said to be produced from the seeds of species of the two genera, thea and camellia, which oil is nearly unknown in Europe. When fresh it is quite free from smell, of a pale yellow tint, and devoid of sediment. It resists a cold of 40°, and its density is 927. It burns with a remarkably clear white flame. This oil might prove an important article of commerce in the East, because in its properties it is superior to cocoanut oil, and the various other oils used for burning. From the leaves of the Australian eucalypte on oil can be procured of equal utility to the cajeput oil of the East. Among the various kinds of oils used in Northern Germany, especially in the kingdom of Hanover, that extracted from the nuts of the beech is deserving of notice. Beech oil does not play a prominent part in commerce, nor is it likely to do so, owing to the fact that it cannot be obtained in large quantities. The country people who collect the nuts, or who cause them to be collected, use the greater part of the oil extracted from them in their household, and dispose only of the remaining fraction. About the beginning of November the nuts are gathered, either by picking up those which have fallen to the ground, or by spreading large sheets under the trees and beating the branches with poles, so as to cause the nuts to separate from them. Twenty-five pounds of nuts yield about five pounds of oil. The oil is of a pale yellow color, and has an extremely agreeable taste. It is often adulterated with walnut oil; the latter is even sold as beech oil, and this may account for the difference of opinion respecting the quality of beech oil. The townspeople use it chiefly as salad oil, but the peasantry employ it as a substitute for butter, etc., and only when there has been a good harvest for nuts, for burning in their lamps. The nuts are, after the oil has been expressed, made into cakes about nine inches square, and an inch and a-half thick: these are used for combustibles.—*Technologist.*

Rubidium.

According to the latest experiments of Prof. Bunsen in connection with the preparation and properties of this metal, it appears that it may be reduced from carbonated aciferous tartrite of oxide of rubidium(in a manner similar to the reduction of kalium): 75 grains of that salt will yield 5 grains of pure metal melted to a compact mass. It is very light, like silver, its color is white, with a yellowish *nuance*, hardly perceptible. In contact with air it covers itself immediately with a bluish gray coating of suboxyd, and is inflamed (even when in large lumps) after a few seconds, much quicker than kalium. At a temperature of 14° Fahr., it is still as soft as wax; it becomes liquid at 101-3° Fahr., and in red heat it is transformed in to a greenish-blue vapor. The specific gravity of rubidium is about 1·52. It is much more electro-positive than kalium, if combined with the latter to a galvanic chain, by acidiferous water. The rubidium, thrown on water, will burn and show a flame of the same appearance as that exhibited by kalium.

Correspondence

Pyroligneous Acid in Chimneys.

Messrs. Editors:—In your last paper I noticed the article under the above heading, and believe I can suggest a remedy for the moisture in the chimney, which is as follows:—The pipe should not be less than six inches diameter, with round joints or elbows to give the smoke a natural curve around the corners, and where it enters the chimney the pipe should be enlarged and made oval, so that the widest way will be equal to the width of the flue, and the narrowest way equal to the thickness of the flue. The chimney is small, but will improve the draught, and be, I think, an effectual remedy, provided no other pipes enter the chimney near this one.

Wm. O. Glover.

New Milford, Conn., Feb. 20, 1865.

Dental Plates.

Messrs. Editors:—If your correspondent S. H. will use pure platinum for his plates, and have the teeth soldered fast with pure gold, he will have no further trouble with the galvanic action of which he justly complains. Or, he may have the teeth baked on to the platinum plate, by Allen's or Moffit's plan or process. This kind of work is better for under sets, but almost too heavy for upper. The best plate for upper sets, when properly got up, is the vulcanite or hard rubber.

Philadelphia. W. P. H., Dentist.

The English and the American Patent Offices.

Our English contemporaries have for some months been discussing the important subject of patents and laws relating thereto, some suggesting the need of reform, others advocating the entire abolishment of them, and similar views. In a late number of the *Westminster Review* can be found the following tribute to the system pursued in our Patent Office:—

The *Review* gives the decided perference to our patent system over that of Great Britain in two particulars. The first is the preliminary examination as to the novelty of an invention by the office previous to the issuing of the patent. This is obviously on the ground that the office can perform this work much better than the inventor, especially where, as in this country, according to the *Review*, the examiners "are men of exceptional talent."

He is thus saved the expense of taking out a patent which has been anticipated, or from the greater expense, besides the loss of time involved, of having this examination made for him. The records of the English courts show a vast amount of litigation which is thereby avoided. Instances are cited in which patents have been litigated for years at a cost ranging from £15,000 to £25,000, when at last it has been discovered that the invention was not novel. The writer sums up the argument on this point by saying;—"Moreover, it (this examination) prevails in a country which is more worthy to instruct us in patent matters than all European countries combined—the United States of America." The other respect in which the preference is given to our system is the relative cheapness of patents. This, evidently, is a wonderful stimulus to invention.

Engineering Schools.

We judge that "parents and guardians" are beginning to appreciate the value of instruction on practical subjects, or, to speak more postively, feel that by familiarizing their children or wards with science from their youth they will have something certain to rely upon when their majority is attained. We infer this from the number of institutions where engineering and other scientific studies are prominent courses. At the Delaware Literary Institute in Franklin, Delaware Co., N. Y., surveying, civil engineering, geometrical and mechanical drawing, as well as the construction of common roads and railroads are taught; lectures on the various elements, imponderable agencies, etc., are given, and the general course at the Institute is to make the pupils proficient in the modern professions. We understand that this institution is in a flourishing condition.

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MEDALS FOR INVENTORS IN FRANCE.

We find in *L'Invention* a list of the awards of silver and bronze medals recently made by the French *Societe d'Encouragement Pour l'Industrie Nationale.* The principal awards of silver medals were as follows :—

MAKING GEISSLER TUBES.

The first medal was decreed to M. Alvergniat, Jr., for the introduction into France of the manufacture of those glass tubes which exhibit such curious electrical phenomena and are known as Geissler tubes. France as well as other nations had previously obtained these tubes wholly by importation from Germany.

DIAPHRAGMS OF BOILERS.

The second medal was for a beet root press. The third was bestowed upon M. Boutigny d'Evreux for his diaphragms for steam boilers, which the committee say are of great service in removing scale.

ELECTRIC LAMP.

It is sometimes necessary to enter an atmosphere of poisonous gas, to rescue persons who have fallen in it, or for some other purpose. This can be done by having in the mouth the ends of breathing tubes communicating with the free air. But if a light is required, an ordinary lamp would not answer the purpose, as it would be extinguished in the poisonous gas. Messrs. Dumas and Benoit have devised an electric lamp to be used in this case. It consists of a single galvanic battery, a Ruhmkorff coil, and a Geissler tube, all arranged in compact form. The Association say it has been tried successfully in the mines of Alais and Saint-Etienne, and they are therefore happy to decree the inventors a silver medal.

MANUFACTURE OF GLASS AND EMERY PAPER.

The committee remark that the use of polishing paper dates from 1792. A manufactory of the article was established by Mr. Fremy in 1814, and his son M. Dumas Fremy, has now a manufactory at Ivry, which is a model establishment; both in the excellence of its products and in the care for health and well being of the workmen. A silver medal is, therefore, awarded to M. Fremy.

ELECTRO-MAGNETIC ENGRAVING FOR CALICO ROLLERS.

A silver medal was awarded to M. E. Gaiffe for an improved process of engraving copper rollers for printing calico by magneto-electricity. The process is not explained but an explanation is promised at some future time.

BEEF TENDONS FOR STEPS.

M. Gautron, a manufacturer of centrifugal machines, having experienced great difficulty in finding any material which would endure the severe friction at the bottoms of the shafts, finally succeeded perfectly with the tendons of beeves. His machines run at a velocity of from 1500 to 2500 revolutions per minute, but the tendons last a long time and require very little oil.

The report also says that these machines have been used with success in the manufacture of potato starch, producing an article of perfect whiteness and purity.

THE DYEING OF THE NINETEENTH CENTURY.

A medal was awarded to M. Grison for his work with this title.

BALANCES OF PRECISSION.

M. Hempel employs thirty workmen in manufacturing delicate balances for scientific investigations, and he received from the society a silver medal for the excellence of his workmanship.

BLOWING UP BUTCHERED ANIMALS.

A bronze medal was bestowed upon M. Beliard for an apparatus, consisting of vessels of compressed air and india-rubber tubes, for blowing up the skins of slaughtered animals to facilitate their removal. It is said to be more convenient for the butcher boys than the bellows at present in use.

IMPROVED MODE OF RAISING OYSTERS.

M. Kemmerer, of Saint Martin, Isle of Re, places the young oysters in cells formed in tile quite similar to the cells in which bees raise their young. This is said to cause a rapid and remarkably perfect development of the mollusk.

PETROLEUM.—The value of a tract of land on Oil Creek, Venango county, Pennsylvania, two miles in width and twenty miles long, is estimated at two hundred and fifty millions of dollars. Four years ago his land was hardly worth five dollars an acre.

CEMENTATION OF IRON BY CARBON FROM GAS RETORTS.

The last number of *Le Gaz* publishes a note from M. Caron, presented to the French Academy of Sciences by M. Sainte-Clair Deville, giving the result of an experiment with gas retort carbon for converting iron into steel. The experiment was suggested by a statement of M. Regnault, that in furnaces at Sevres the porcelain is blackened when it was placed in the neighborhood of a morsel of graphite from gas retorts, and that in the same circumstances iron is transformed into cast iron. M. Regnault inferred from this that gas retort carbon might be more active in the cementation of iron than charcoal.

M. Caron placed a bar of wrought iron, four-tenths of an inch square and a foot long, in an earthen tube filled with pieces of gas retort carbon, and buried it in a fire of similar carbon, where it was kept at a cherry red for six hours. On being removed it showed no traces of cementation.

On analyzing the carbon, M. Caron found it to be far more impure than had been supposed. It contained nearly one per cent of sulphur, and traces of potassa and soda. M. Caron says:—

"Thus, in the cementation which I have attempted to produce, I have put in contact with the iron a coal very sulphurous and containing no sensible quantity of free alkali. But I had previously demonstrated that in these circumstances acieration could not take place, because the production of alkaline cyanides was impossible. The result which I have obtained is therefore a confirmation of the theory of cementation that I announced six years ago."

He then repeated the experiment, but with the addition of 10 per cent of carbonate of potassa, and the cementation was easily effected. The same result was also produced by adding 10 per cent of natural carbonate of baryta.

ASPARAGUS A SUBSTITUTE FOR COFFEE.

Some two years since a patent was obtained by Mr. James P. Gage, of Staten Island, for the use of asparagus as a substitute for coffee. He asserts that the seed and root of asparagus are found to contain caffein, the peculiar principle of coffee, in larger quantities than the coffee berry.

Caffein can be extracted from coffee and obtained in white crystals by a chemical process which is not very complicated. The coffee is first soaked in ether which dissolves and extracts the caffein. The solution is then mixed with water, and the subacetate of lead is added, when the caffein is thrown down in a solid precipitate. After the removal of the excess of lead, and filtering, the caffein is obtained in white needles, slightly flexible and transparent, with a silky luster, feebly bitter, and free from odor. Coffee contains from $\frac{3}{5}$ to $6\frac{4}{10}$ per cent of caffein; the weakest being the St. Domingo, and the strongest that from Martinique.

If the root and seed of asparagus do really contain caffein in larger quantities than the coffee berry, it is a very interesting fact. We should like to see the matter tested by some of our chemists.

GOESSLING'S CORN-SUGAR PATENTS.

As we continue to receive applications for copies of Goessling's patents for making corn sirup, the claims for which were inadvertently forwarded on the 10th of May last, when the patents were not issued, we publish the following letter relating to the subject from the Commissioner of Patents:—

U. S. PATENT OFFICE, Feb. 16, 1864.

GENTLEMEN—No patents have been granted to F. W. Goessling, of May 10, 1864. Respectfully,

D. P. HOLLOWAY, Com.

MESSRS. MUNN & Co.

A patent was issued on the 20th of December, 1864, to Mr. Goessling, and the following is a copy of the specification:—

No. 45,561.—IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.—F. W. Goessling (he having assigned his right, title and interest in said improvements to himself, H. F. Briggs and L. Bradley), Buffalo, N. Y.:

To all whom it may concern—

Be it known that I, Frederick W. Goessling, of the city of Buffalo, County of Erie, and State of New York (assignor to Henry F. Briggs, Lyman Bradley and myself), have invented or produced a new compound sugar, and I do hereby declare that the following is a full and complete description of the manufacture or compounding thereof.

The nature of this invention relates to the manufacture of a new article of sugar from a combination of cane sugar with corn sirup. I take a sirup made from Indian corn by any known process of making corn sirup or corn sugar; the process being carried to that point where the sirup is purified and rendered in a condition to granulate or crystallize.

I also take a quantity of cane sugar (any kind or quality of cane sugar will answer the purpose, and dilute it or reduce it to a liquid sirup and purify the sirup by any known process of purifying cane sugars and render it in a suitable condition for crystallization. These two sirups are then mixed or combined together for crystallization and conversion into a new compound sugar, the crystallizing process being completed, and the new sugar perfected after the combination of the two sirups. The crystalizing process may commence in each sirup before the two are combined, and be completed after their combination.

After the mixture of the two sirups, as above stated, the mixture will be in a thick semi-liquid state, and it is then transferred to the mold for the completion of the crystallizing process, and the further treatment by "liquoring" in a common manner.

The proportion of cane sugar or cane sirup used in combination with the corn sirup, is not definite or material, as a larger or smaller quantity will effect the purpose.

The object and effect of this combination is to induce the whole mass to crystallize in the same manner that cane sugar does, and to give the whole the taste and the qualities of cane sugar.

I also propose, in some cases, to use the sirups produced from wheat and other cereals, as a substitate for Indian corn sirup in combination with cane sugar, and for the same purpose as above stated.

What I claim as my invention, and desire to secure by Letters Patent, is a new and improved compound sugar made by a combination of cane sugar or cane sirup with corn sirup, substantially as set forth.

Good Books.

The new and enterprising publishing house of Messrs. Hurd & Houghton, No. 401 Broadway, have added to their large and valuable stock by the purchase of the entire list of publications of J. G. Gregory, consisting of J. Fennimore Cooper's Works; "Forest Pictures in the Adirondacs," by John A. Bowes; "A Selection of War Lyrics," with illustrations by Darley; "A Forest Hymn," by Wm. C. Bryant, illustrated by John A. Hows; "In the Woods," illustrations by John A. Hows; "Christmas Poems and Pictures," illustrated; "The Vagabonds," illustrations by Darley; "The Snow Image," by Nathaniel Hawthorne, illustrations in colors; "Spectoria," surprising spectral illusions; "Golden Leaves from the British Poets"; "Golden Leaves from the American Poets." This firm keep a general assortment of the best books to be found in the market.

A Valuable Patent.

The Hartford Arms Company, just organized for business, has a Government contract for 200,000 Hammond rifles, and has agreed to pay the inventor, a Bridgeport mechanic, $10,000 in gold or its equivalent in cash, $2 on each rifle manufactured, for the patent, and a salary of $2,500 as superintendent of their manufacture. The statement in some of the Connecticut papers that this arm has been selected out of thirty different models as the one for the United States service, is erroneous, as the military commission appointed to make a selection, and who have been in session in Hartford, have as yet reached no conclusion.

ANTIQUITY OF ZINC.—A strange discovery, if true, has just been made at Pompeii. The *Italia* of Naples states that a fountain has been discovered there, covered with zinc. It is added that this is the first time that the said metal has been found at Pompeii. We should think so; for though the ore was known to the Romans, the metal was not extracted from it, so far as our knowledge goes, until the sixteenth century, by Paracelsus.

STATISTICS show that cows in good condition require about thirty pounds of hay per day.

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Flour Bolt, Duster and Cooler.

The nature of this improvement consists in the application of a blast of air of the ordinary temperature of the atmosphere, or below it, to the exterior surface of the bolting cloth, for the purpose of keeping the meshes of the cloth dry and clean, and at the same time cooling and drying the flour. The engraving illustrates the device, which consists of a conical-shaped tube, A (Fig. 2), made of zinc, tin, sheet-iron or any light substance, having one or two lines of perforations, B, or slots, running its length, or the length of the bolt reel, C. The tube is applied by passing it through the length of the bolt chest, above the center of the bolt reel, with the line or lines of perforations or slots directed towards the cloth and the center of the reel, and in close proximity to the bolt cloth. Air introduced under pressure at the large end of the tube by a fan, bellows, or air pump, throws a strong, sharp and even blast of air through the perforations, B, in the tube, against the exterior surface of the cloth, covering its interior surface at each revolution of the bolt reel.

Fig. 1.

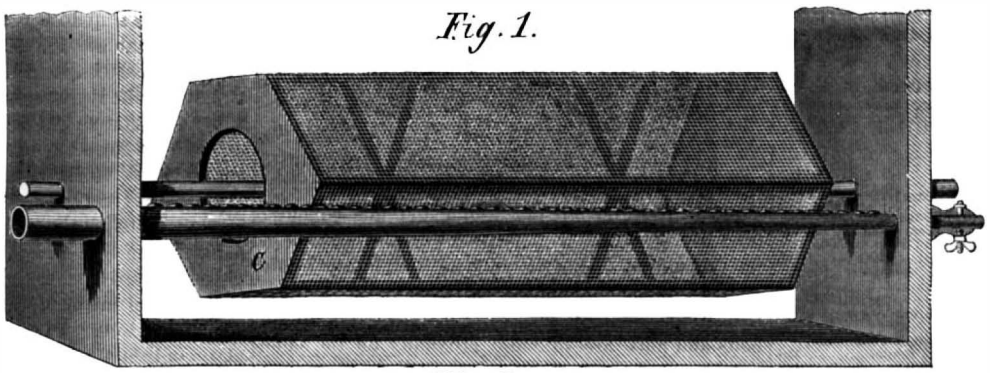
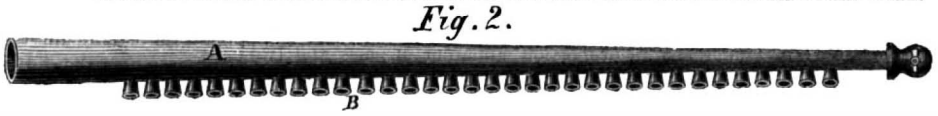


Fig. 2.



BOON & STEVENS'S FLOUR BOLT, DUSTER AND COOLER.

The advantages gained by this improvement are many, and will be readily suggested to the mind of every practical miller in the land. Some of its advantages are thus spoken of by Messrs. H. L. Bennett & Co., of Novelty Mills, Avon, Ill., who have one in use:—

"It keeps the meshes of the bolt cloth dry, clean and clear, thereby enabling a much finer bolt cloth to be used, and raising the grade of the flour. It greatly increases the bolting and grinding capacity. It also cools the meal directly after it is discharged into the bolt, thereby dispensing with other cooling apparatuses. The meal may be carried directly from the stones or grinding surfaces into the bolt, and the flour comes from it as cool as the air that is thrown into the bolt chest. In damp and warm weather, or in grinding damp grain, it produces a yield of from one to three pounds more of flour to the bushel. By keeping the bolt cloth dry, clean and cool, it adds to its durability. As the air that is thrown into the bolt chest can be of any desired temperature, the operation of grinding and bolting can be perfectly uniform at all seasons of the year and in all kinds of weather. Through the application of this cool dry air the moisture is driven out of the flour, and it is in a condition to be packed directly from the bolts, without danger of souring. A large amount of flour is annually lost by being packed too damp or in a heated condition. Flour by remaining for a length of time in a damp or heated state, if it does not actually sour, loses much of its value."

This invention was patented Dec. 6, 1864. For further information address Chas. L. Stevens, Galesburg, Ill.

Pumping Machinery.

We take the following paragraphs from the report of Chief Engineer Birkinbine, of the Philadelphia Water Works:—

"The dam at Fairmount was constructed by Mr. Ariel Cooley; the first crib was sunk on the 19th of April, 1819, and water flowed over the dam January 25th, 1821. Mr. Cooley died a short time prior to its completion, from the effects of exposure while building it.

"The over-fall of the dam is 1204 feet long; the mound-dam 270 feet, and the head arches 104 feet; making its whole length, including the Western pier, 1600 feet. It backs the water up the river for six miles."

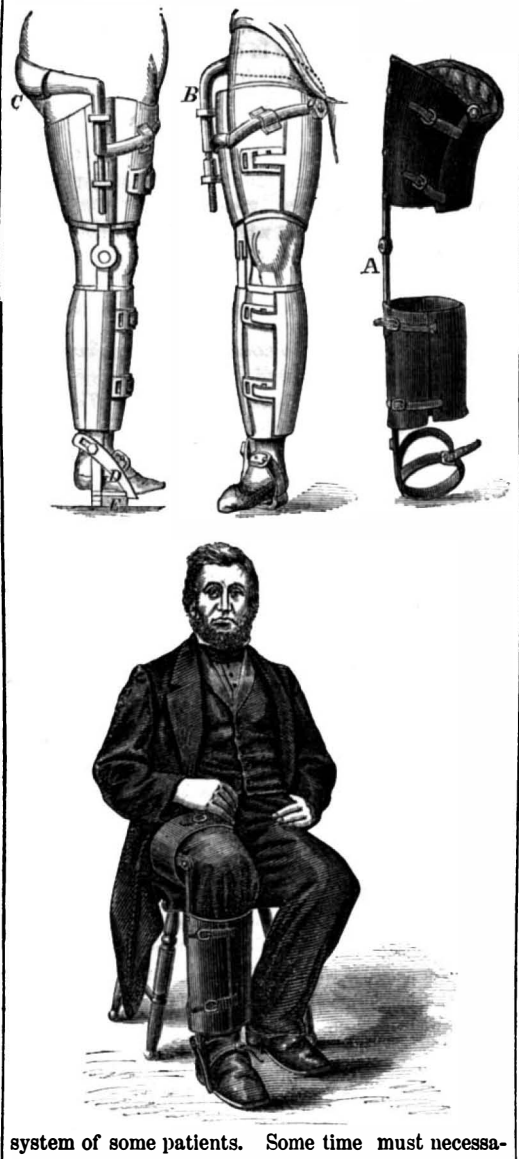
Respecting the Fairmount dam he says:—"Wheels Nos. 4, 5, 6, 7 and 8 were made as heavy as possible, under the mistaken idea that the increased momentum of the rim would give efficiency to the wheel. On account of this weight they cannot be kept in repair. It is necessary to be continually renewing the starts, buckets and soleing. The pumps connected with these wheels are, with the exception of that attached to No. 4, broken in some important parts."

And of some water wheels:—"The hot water heating apparatus placed in the new mill house answers the purpose; maintaining it sufficiently warm to prevent frost, and making it comfortable to work in without the annoyance of dust and gas, as was the case with the old stoves. The heat is diffused throughout the whole building better than with stoves, and with a large saving of fuel."

ALLEN'S SUPPORTER FOR FRACTURED LEGS.

The confinement consequent upon fracturing a leg is very tedious, and wears greatly upon the nervous system of some patients. Some time must necessarily transpire before the bones are firmly knitted so as to sustain the weight of the body, and unless crutches are used, convalescence is sometimes as hard to be borne as the pain from the injury. The object of this invention is to allow the patient to walk about and take moderate exercise, during recovery, whereby the general health is much benefited. No crutches are used and the wounded leg is undisturbed.

Fig. 3. Fig. 2. Fig. 1.



The body is supported entirely by metallic braces, as at A, in Fig. 1, and these braces are connected to a padded clamp, B, Fig. 2, which is sttapped to the thigh. The main support, A, has a joint at the knee so that the limb can be bent for walking or sitting down, and the lower end of the main support is bent under the foot, at right angles, so as to carry the foot and support the legs. Thus it will be seen that the body rests entirely upon this foot-piece and not upon the leg at all.

To prevent the leg from the possibility of coming in contact with the ground by slipping the pad, the body is further supported by another pad passing under the posterior portion of the frame, as at C, (Fig. 3), and there is an angle piece, D, at the bottom of the foot, which can be adjusted at any desired elevation so as to support the front part of it; a vulcanized rubber cushion, E, at the bottom of the whole, makes this supporter noiseless when used on uncarpeted floors or pavements, and prevents the iron from injuring furniture in the house when laid against it. The full length figure, which is published with the supporter applied, and worn in a sitting posture, shows the position of the several parts when so used.

The exact length of the supporting bar is not of great consequence, as individuals can be fitted with the apparatus especially; limited adjustment is possible, however, by the nuts on the thigh clamp, B.

When the patient is to be seated for any length of time, the clamp, B, can be taken off by unscrewing the nuts, and the instrument can be worn inside or outside of the pantaloons as desired. This appliance will doubtless be found useful for wounded soldiers, persons with sprained limbs and others. It is noiseless, has no squeaking joints, and seems in all respects desirable. A patent was procured on it through the Scientific American Patent Agency, on the 4th of October, 1864, by D. H. B. Allen, of Chelsea, Vt. Town, county and State rights for sale. For further information address the inventor as above.

Tellurium.

The curious metal, or metalloid, which Klaproth named tellurium, has hitherto been one of the rarest of known substances, found only in a very few localities—chiefly in Hungary and Transylvania—and there only in such minute quantities that its selling price in England has never, we believe, fallen below 10s. per ounce. In a paper, however, on the mineralogy of South America which is contributed to the January number of the *Philosophical Magazine* by Mr. David Forbes, F.R.S., we are told of an ore of bismuth which contains not less than five per cent of tellurium. This ore occurs in Bolivia, about two-thirds up the mountain of Illcampu, which is the highest of all the peaks of the Andes, towering to nearly 25,000 feet above the level of the Pacific Ocean. It is thus far from being convenient of access; still, the demand for bismuth has sufficed to set men mining it—at an altitude of 15,000 feet, and only slightly under the line of perpetual snow—so that we may expect tellurium, as well as bismuth to be soon very much cheaper than hitherto.

PETROLEUM INVENTIONS.—More than thirty patents were issued in the last six months of 1864 for inventions relating to petroleum, such as drills for boring wells, devices for removing paraffine and other obstructions from the veins of the rock, pumping and raising oil, lining oil barrels, etc. Many more applications still remain in the Patent Office unexamined, and, judging from the number of new cases we are constantly sending forward, the present year will be still more prolific of successful inventions in this profitable field.

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NEW YORK, SATURDAY, MARCH 4, 1865.

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THE PRESSURE ON A SLIDE VALVE.

It is a popular idea that the number of square inches in the back of a slide valve, and the pounds of steam in the chest, represent the total pressure upon the valve. Another delusion is, that the pressure on a slide valve is equal to the pounds of steam per square inch on the back, minus the area of the steam ports. If we consider the valve to be a solid block of iron on a solid table, and mechanically tight, the steam would press on every square inch of surface with the same force that a dead weight laid upon it would. But these conditions are never found in a slide valve, except in one position; that one, when the valve laps over both ports, and the engine is at rest.

So soon, however, as the valve is moved the steam enters the open port and the pressure is practically taken off that end of it. When the valve is moved back over the port, the steam that is shut up within the cylinder will press up against the under side of the valve face with a force exactly equal to the pressure at the point in the stroke of the piston at which the valve closed. As the valve continues its stroke the other port will be opened, and the steam we have supposed shut up in the cylinder begins to exhaust; at this time, the pressure against the under side of the valve will be the pressure in the cylinder at the end of the stroke. This pressure is only for a brief period, however, for in a well constructed engine the time of exhausting the contents of the cylinder is very short. While the steam is entering the open port, then, and after the exhaust has passed through the closed port, the pressure on the under side of the valve will be just the ordinary back pressure, supposing the engine to be non-condensing—which is the supposition we have entertained in this discussion.

It is therefore unquestionable that to determine the pressure on a slide valve we must consider the pressure in the cylinder at the time of cutting off, at the end of the stroke, the area of the ports, the area of the back, and the back pressure on the piston.

THE REPORT ON SCREW THREADS.

The mechanical readers of this journal will be interested in the report on screw threads from the Committee of the Franklin Institute, which we publish in another part of this issue.

In common with the trade we have felt the necessity of reform in this particular, and have lost no opportunity of calling attention to it.

In regard to the decision of the Committee we think it a wise one, and a happy conclusion of an arduous duty. They recommend the adoption of the V-thread, flat on top, and flat in the bottom of the space, with pitches varying, of course, with the size of the bolt. The standard can be found in the report.

The thread recommended for adoption has for a long time been the most popular with good mechanics, as a fair compromise between a square and a triangular thread, also on account of the ease with which it is made and its durability, so that there will be no prejudices to overcome, and the adoption of it is more likely to meet with favor than a rounded top and bottom thread, which was properly discredited. Threads of this class, when new, always look as though they were half stripped, and they tend to strip quicker than others, for the very act of stripping is caused by one thread mounting or riding over the other; rounded threads facilitate this very greatly, especially with fine pitches.

In regard to the sizes for rough and finished nuts, there are some who will disagree with the decision of the Committee. They recommend that finished nuts and bolt heads be one-sixteenth smaller every way than rough nuts. It frequently happens that rough bolts and nuts are in close proximity on the same machine. If a rough five-eighth bolt head, with a finished nut is used, as is often the case, there is a difference in proportion apparent at once, and two wrenches must be provided where one would suffice. One wrench must be used for the rough bolts and another for the finished ones, and it is more likely that the largest wrench will be frequently used by careless men, on the smallest nuts, so that the corners will soon be rounded off. If we suppose that screw wrenches are always at hand, then these objections have no weight; but wrenches of that class are not always to be had, and when we speak of wrenches, it is of permanent ones, which are always sent with machines. There should be but one size for rough bolt heads and nuts and finished nuts; the excess for finishing should be allowed in forging, but should not be put forth as a standard. Since nuts are for the most part made in dies, now-a-days, there would be but little difficulty from want of exactness in the angles, so that the wrenches would fit. We have no disposition, to be hypercritical, however, and congratulate our mechanics that they have fallen into the hands of such able advisers on this subject, as composed the Committee, and not into the toils of schemers and theorists who would have confused instead of making the subject plain and practical.

THE FIELD OF INVENTION INEXHAUSTIBLE.

We have good reason to congratulate ourselves, as a people, upon the degree of perfection to which our inventors have brought domestic utensils. There is scarcely an article in common use which has not been very greatly improved within the last few years. Indeed there are many things entirely new and original in conception which add very much to the comfort and convenience of housekeepers.

Bread kneaders, knife scourers, potato mashers, butter workers, laundry stoves, adapted specially for heating sadirons, mechanical coffee roasters, pans for baking rolls so that an inviting and toothsome crust is left on all parts, top and bottom and sides, cleaners for kerosene oil chimneys, these and similar articles abound, and the modern American kitchen is incomplete without them.

Very many persons imagine that after one thing of a kind is invented every one else is excluded from that field and must ever after sit down and fold their hands, or else cast about for something as yet untried. This view is an erroneous one. Sterne, a modern English writer, makes one of his characters, "Uncle Toby," say to an intrusive fly which he is putting out of the window—"Go, the world is wide enough for me and thee." It is the same with invention, the world is wide enough for all, and it is not every article that suits all tastes.

It is fortunate for the general welfare that this is so, otherwise there would be no trade except a limited one, and the arts would come to a stand still. Every person who has any device for lessening or expediting work or performing it in another manner should see that it is brought prominently before the public without delay.

THE Chicago-Lake-Erie tunnel progresses at the rate of twelve feet in twenty-four hours.

IMPORTANT ENGLISH PATENT LAW CASE.

We are indebted to Mr. Hayes, Chief Clerk of the Patent Office, for the report of proceedings in the Court of Queen's Bench, on a demurrer, to the declaration in a petition of right claiming damages against the British Government for infringing a patent granted to Robert B. Feather for certain improvements in the construction of ships. The report of the trial was forwarded to Mr. Hayes, by George J. Abbott, Esq., U. S. Consul at Sheffield. The patentee claims to effect considerable economy in the building of ships or vessels, and at the same time add to the strength, buoyancy, and durability, and also to secure them against more extensive or fata injury arising from leakage in the constructing of ships or vessels of wood and iron combined, or what the patentee terms union-built vessels. The bottom and lower part of the frame of the hull of the vessel is to be constructed of timber, as heretofore, to about one-half, more or less, of the perpendicular hight of the vessel, exclusive of the bulwarks or top sides. From that point or mark, upwards, the vessel must be constructed of iron. To carry out this object sheets or plates of iron are raised upon stanchions or ribs made sufficiently strong, and formed with equalized saddle bars, set across the timber heads, main walls, and ceilings, over the futtocks to the keel inside, and outwardly as low as necessary, and firmly-bolted through them; or if preferred or considered more advantageous, the iron ribs or stanchions, with requisite receiving plates, could be introduced at suitable distances as for entire iron vessels. The intervening spaces between the ceilings and the walls are intended to be filled in solid to a sufficient depth to receive the bolts and fastenings of the iron ribs or stanchions, the upper portion of the main walls being laid diagonally either way, with a view to increased strength. The stem and stern post to be entirely of timber or of iron from the line of the union streak upwards.

The petitioner claimed damages to the extent of £10,000 sterling for infringement of his rights.

The Attorney General, who appeared to support the demurrer, argued, first:—"That these Letters Patent of inventions—and particularly this now before the court—are to be construed according to the general principles of law applicable to Crown grants, and that being so they will be found not to restrain the Crown from using an invention, or the grant of any privilege whatever as against the Crown. Second—That if the contrary construction were put upon such Letters Patent, particularly like that in this case, which relates to alleged inventions of the naval and military defence of the country, such Letters Patent would be against public policy and simply void as to restraining the Crown from its use. Third—That when we come to examine the statutes and authorities as to Letters Patent of inventions they will be found to contain nothing to invalidate but rather to support that conclusion. And, lastly, I submit if these arguments should fail to recommend themselves to your judgment, and you should hold against me on every one of these points, then the necessary consequence of such a conclusion is that the Crown is not liable on a petition of right; but if wrong has been done by individuals, whether by the Lords of the Admiralty or any other persons—if that be so, then the remedy is not by petition of right against the Crown, but by action against those who did the supposed wrong."

Mr. Bovill, who appeared for the petitioner, contended that there was not a trace in the experience of any living man of the Crown having asserted its right to use patents without payment to the patentee. And the astounding proposition is announced now for the first time that the Queen is entitled through the public departments to take what is the supposed private property of individuals and appropriate it without remuneration. In 1816 Sir William Congreve, who was then the director of the Artillery Department at Woolwich, was restrained from the use of Mr. Walker's patent. Sir William Congreve had supplied certain articles, and he was charged with a breach of the patent, and he was restrained by injunction, but it was not set up that Sir William Congreve was at liberty to use the invention for the good of the public service. Lord Eldon considered Sir William Congreve was not entitled to use the patent, but from the urgency and necessities of the case he was allowed to supply the articles for the

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Government, an account, however, being kept for the remuneration of the patentee. The power of the Crown has reference only to the granting of a privilege, and not to any right in the invention, having no knowledge of it, and it was very different from those grants where there was some prerogative right, or a presumed prerogative right, possessed by the Crown, such as a grant of a fair or market and franchises of that character. After referring to the several authorities quoted by the learned Attorney General, he said:—

"If the case is to be de ermined with respect to considerations of public policy, how can any officer of the State rise up in his place and say it is public policy, in all cases of munitions and implements of war, to drive every inventor to foreign countries, because the inevitable result, if their lordships' judgment should be in favor of the Crown, will be to do that."

Mr. Bovill hit the nail square on the head; and we do not see how any sensible man can adopt any other view of the matter. The Lord Chief Justice, however, intimated that judgment in the case would be rendered in favor of the Crown, on the maxim, we suppose, that "the king can do no wrong."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Grain and Grass Harvester.—This invention relates to an improved sickle-driving mechanism, whereby a requisite speed may be obtained by a very compact arrangement of parts. The invention also relates to a novel manner of applying the seat to the machine whereby the weight of the driver is made to act in the most favorable manner towards balancing the machine and in assisting in elevating the finger bar. The invention also relates to a lever applied and arranged in such a manner, relatively with the draught pole, as to cause the outer end of the finger bar to be elevated when the inner end of the same has been elevated a certain hight. The invention also relates to a new and improved shoe arranged and applied in such a manner as to support the front part of the machine and partially sustain the finger bar so that it will run lightly over the surface of the ground, and at the same time serve to protect the pitman which drives the sickle. The invention further relates to a novel manner of attaching the finger bar to the main frame of the machine, whereby a strong and durable joint connection is obtained. Frederick Nishwitz, of Brooklyn, N. Y., is the inventor.

Arrow Projectile.—This invention consists in the application to a projectile of a telescope stem provided with wings in such a manner that when the projectile is prepared for use said stem can be contracted within the limits of the cartridge bag, but when the charge is fired, and as soon as the projectile leaves the muzzle of the barrel, the stem elongates by its own inertia and gives balance and steadiness to the projectile in its flight, thereby increasing the range, velocity, and also the certainty of striking the object fired at. The wings being secured to the tubular end of the stem do not interfere with the revolving motion of the projectile if the same is fired from a rifled barrel. The stem is secured to a cap which is perforated with holes, and from the outer surface of which rises a rim with an internal screw thread which screws on the inner end of the projectile, leaving a shoulder for the soft metal ring to rest on, in such a manner that when said cap, with the telescope stem contracted, is introduced into the cartridge bag, said bag can be readily filled with powder through the perforations in the bag, and by screwing the projectile down into the rim of the cap, the edge of the cartridge bag is clamped between the soft metal ring and the shoulder of the cap, and no further fastening is required for it. Capt, Thomas S. Orwig, 219 Broadway, New York, is the inventor.

Rotary Engine.—This invention consists in two revolving piston wheels connected together by cog wheels and placed concentrically in two adjoining cylinders in combination with a valve which occupies the channel leading from one cylinder to the other, and to which motion is imparted by concentric or other equivalent means, mounted on the shafts of the piston wheels, in such a manner that said piston wheels and intervening valve are alternately acted upon by the steam passing through the channel connecting the two cylinders, and that by the action of the valve and piston wheels one cylinder takes steam while the other exhausts, and *vice versa.* The cog wheels which gear the two shafts of the pistons together are eccentric, the same as the pistons, so that their circumferential speed corresponds with that of said pistons. John P. Eilis, of 22d. Reg. Wis. Vol. Inf., Nashville, Tenn., is the inventor.

MARKET FOR THE MONTH.

The peculiarity in the trade during the month of February is the absence of fluctuations in the price of gold and other commodities. The prices of the leading staples on the 22d, compared with those on the last Wednesday in January, were as follows:—

	Price Jan. 25.	Price Feb. 22.
Coal (Anth.) ℔ 2,000 lb.	$12 00 @12 50	$14 00
Coffee (Java) ℔ lb.	47 @ 38	47 @ 48
Copper (Am. Ingot) ℔ lb.	45 @ 46½	44 @ 45
Cotton (middling) ℔ lb.	84 @ 85	83 @ 84
Flour (State) ℔ bbl.	$9 20 @ 9 70	$9 80 @10 40
Wheat ℔ bush.	Nominal.	2 50 @ 2 80
Hay ℔ 100 lb.	$1 50 @ 1 90	1 70
Hemp (Am.drs'd) ℔ tun.	320 00@390 00	$320 00@390 00
Hides (city slaughter) ℔ lb.	13 @ 13½	13 @ 13½
India-rubber ℔ lb.	72 @ 1 20	72 @ 1 15
Lead (Am.) ℔ 100 lb.	13 00	13 00
Nails ℔ 100 lb.	$8 50 @ 9 00	8 50
Petroleum (crude) ℔ gal.	45 @ 45½	45
Beef (mess) ℔ bbl.	$19 00 @24 00	18 00 @24 00
Saltpeter ℔ lb.	30	30
Steel (Am. cast) ℔ lb.	19 @ 34	19 @ 34
Sugar (brown) ℔ lb	16 @ 22	15 @ 20
Wool (American Saxony fleece) ℔ lb.	90 @ 1 10	90 @ 1 10
Zinc ℔ lb.	18 @ 19	18 @ 18½
Gold.	2 05	2 01

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 21, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

46,435.—Horse Rakes.—Hubley Albright, Lewisburgh, Pa.:

I claim, first, The arrangement of the teeth bars, H, and bent rod, E, the latter being attached to the axle, A, as shown, and in such a relative position with the rake teeth, I, to operate as and for the purpose set forth.

Second, The lever, F, in combination with the bars, H F L, and the springs, O, all arranged and for the purpose specified.

46,436.—Rotary Engines.—Wm. Avens and Frederick Fradley, Brooklyn, N. Y.:

We claim the wheel, A, with one or more sets of chambers, B, which are provided each with two channels, d d', situated at opposite corners, in combination with ports, e e', valves, J, and cylinder, F', all constructed and operating substantially as and for the purpose set forth.

[This invention consists in a wheel provided with two sets of chambers, to each of which access is had by two channels situated on the opposite ends of the chambers, and tapering off in opposite directions, in combination with a cylinder fitting closely to the circumference of the wheel, and with valves which open and close the steam ports in such a manner that by admitting steam to the chambers of the wheel a rotary motion may be imparted to the same in either direction, and by a simple movement of the valves the motion of the engine can be reversed at any moment.]

46,437.—Bomb Lance for Killing Whales.—Silas Barker, Hartford, Conn.:

I claim, first, The arrangement of the mode of separation of the lance head, C, and fuse tube, F, from the shaft of the lance, substantially as described.

Second, The arrangement of the adjustable hollow exploding lance head, C, in the manner and for the purpose substantially as herein set forth and described.

46,438.—Adjustable Tool Holder.—Charles Petit Benoit, Detroit, Mich.:

I claim the adjustable holder, B, swiveled in the end of the stock, A, so as to adapt the tool for various kinds of work, substantially as set forth.

Second, In combination with a tool-holder, constructed and mounted as above specified, I claim the washer, E, having grooved or roughened surfaces, and employed in connection with the nut, C', for retaining the tool-holder in position, as explained.

46,439.—Machine for Riving Hoops.—George J. Bentley, Michigan City, Ind.:

I claim the combination of the grooved wheel, D, with the discs, F and F', the latter being suspended in hanging bearings, substantially as set forth.

46,440.—Churns.—Edwin L. Bergstresser, Berrysburg, Pa.:

I claim the double-acting dashers, with the steam reservoir and pipe, arranged and combined as herein described.

46,441.—Brushes for Cannon.—Paul Birchmeyer, Syracuse, N. Y.:

I claim as an article of manufacture an artillery sponge, constructed as described, that is to say, by laying a mat of horse or horned-cattle hair around a central hollow stock or head, and fastening it by a wrapping wire into the spiral groove, the semi-globular end being made by looping in a portion of the mat, as deseribed.

46,442.—Weft-feeding Device for Hair-cloth Looms.—John Blanchard, Pawtucket, R. I. Ante-dated Feb. 16, 1865:

I claim the improved feeder for a hair-cloth loom described, constructed and operated substantially as herein specified.

46,443.—Leather and Process of Manufacturing the same.—Guiseppe Bottero, Boston, Mass.:

I claim the process above described, as well as the material or manufacture produced thereby.

46,444.—Street-lamp Posts.—Philip H. Branson, St. Louis, Mo.:

I claim as a new manufacture a lamp post, constructed in two parts, substantially in the manner and for the purpose herein set forth.

Second, I claim the employment of the chipping strips, C''', substantially as and for the purpose set forth.

46,445.—Variable Exhaust Nozzles.—Myron E. Brown, Buffalo, N. Y.:

I claim, first, Making a conical nozzle in two parts or halves, the said halves being hinged at the base, and so constructed that they lap past each other, so that when expanded by being moved upon their hinges, the lapping parts will prevent any break or opening between the halves, substantially as described and for the purposes set forth.

Second, I claim the flange, C', projecting inwardly inside the nozzle, for the purpose of breaking joints between the seat and base of the nozzle, and thus, by carrying the flange above the joint, prevent steam from escaping at the bottom of the nozzle, substantially as described.

46,446.—Tanning.—Church Burton, Union, Maine:

I claim the tanning of hides and skins with evergreen boughs, such as spruce and fir.

46,447.—Revolving Hay Rakes.—Ezra Calderwood, Portland, Maine:

I claim the combination with the thill, A', of the box, D, movable cap, c', and spring bolt, G, the latter engaging with the notched or recessed wheel, E, upon the rake head, all as herein described.

[This invention relates to a new and improved revolving rake, to be drawn either manually or by a horse, and it consists in a novel and simple means employed for holding the rake in working position, and which will admit of being readily actuated to liberate the rake, so that it may revolve and discharge its load when necessary.]

46,448.—Machine for Cuttiug Pasteboard.—Elizur E. Clarke, New Haven, Conn.:

First, I claim the method herein described of cutting pasteboard, by combining with fixed cutters and revolving cylinder a mechanism for raising and lowering the said cylinder to and from the cutters at given intervals of space, to more or less or not at all indent the pasteboard, or to produce a through cut at pleasure, substantially as set forth.

Second, I claim combining in one machine two cutter bars, provided with adjustable or fixed cutters, with two cylinders geared so as to revolve with equal velocities, one of the said cylinders revolving in fixed bearings, while the other, actuated by suitable mechanism, is raised to or lowered from the cutters, as herein described.

Third, In combination with adjustable or fixed collars and revolving cutter cylinder, I claim a cam cylinder, or wheel revolving in unison with the cutter cylinder, and actuating it to more or less impinge against the cutters at given intervals of space, substantially as set forth.

Fourth, I claim the combination with the cutters, cutter cylinder and cam wheel, a feed bar, actuated by the cam wheel, or any part, moving in unison therewith, in such manner as to feed the sheet to the cutters automatically and at proper intervals of time during the revolution of the cam wheel, to receive the through and score cut between given points, substantially as set forth.

Fifth, I claim the combination of the grooved and flanged disk, with detachable cams and clamps and screw bolts to fasten the cams to the periphery of the wheel, substantially as set forth.

Sixth, In combination with a machine for cutting pasteboard, I claim a sliding and adjustable platform, a table for receiving the scored and cut sheets, the arrangement being such that the said table may be slid under the main cylinder, so as to admit of the operator approaching the cutters to adjust them, substantially as set forth.

Seventh, I claim the combination of the cutter-holder and stock, fitted together by means of a vertical tongue and groove, with one or more horizontal guide tongues on the back of the stock, and fitting and sliding in a corresponding groove or grooves in the cutter bar, or the projecting studs or the cutter stock lapping over and under the cutter bar, together with a binding bolt passing through the central guide tongue, substantially as set forth.

Eighth, I claim the forked arm and grooved screw nut, working in combination with the inverted T-groove in the side of the cutter bars, with the binding screw bolts and nuts, substantially as described, for the purpose specified.

46,449.—Medical Compound.—Alfred P. Coryell, Janesville: Wis. Ante-dated Feb. 16, 1865:

I claim the use of a compound made of the ingredients above specified, mixed together in about the proportion, and substantially in the manner set forth.

46,450.—Horse Hay Forks.—James A. Cowles, Chicago, Ill.:

First, I claim the combination of the key or right-angled lever, f, with the bail pivoted at the eyes, p p, when said bail is located in the described situation, with the handle, c, and head, a a, as and for the purpose herein set forth.

Second, The combination of the head, a, handle, c, key or right-angled lever, f, catch, o o, and bail, in the manner and for the purpose described.

46,451.—Door Fastener.—Elliott H. Crane, Jonesville, Mich.:

I claim the combination of the segmental latch piece, B, vibrating on a pivot within a slot of the plate, A, and actuated by the spring, C, by which the plate being fastened in position the closing door forcing back the latch piece, which is forced to return when the edge of the door has passed it.

[This is a pocket contrivance, designed for use wherever a convenient temporary door lock is wanted. The improvement relates to a peculiarity of construction, by which a spring bolt is employed in such a manner as to have an automatic action, so that by the act of closing the door the latter becomes locked. This is a device that everybody wants, for it can be instantly applied to any door, without screws or nails.]

46,452.—Clothes Dryer.—Ephraim Culver, Shelburne, Mass.:

I claim the combination of the slotted and movable arm, c, the movable brace, d, and hub, f, and the screw and nut, e, substantially as and for the purpose described.

46,453.—Fishing-line Sinkers.—Ebenezer F. Decker, Southport, Maine:

I claim as my invention the combination of the guard ring, the line, the swivel, the sinker and the arms, D B, the whole being arranged substantially as specified.

46,454.—Plows.—John Deere, Moline, Ill.:

First, I claim the combination of the landside side, A, with the solid lugs, 3 3 3, and the perforated ear, 5, substantially as and for the purpose set forth.

Second, The lug, 3, cast on the landside, substantially as and for the purpose set forth.

Third, The guide and fastening ear, 5, in combination with the movable standard, substantially as and for the purpose set forth.

Fourth, The combination of the landside standard and mold board, by means and in the manner substantially as described.

Fifth, The construction of the shear, C, with the perforated ear, g, substantially as and for the purpose set forth.

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46,455.—Soap-stone Stove.—Porter Dodge, Perkinsville, Vt.:

First, I claim constructing and arranging the corner pieces. C, of the iron skeleton frame of a stove, so that they hold the soap-stone slabs and the outer open iron work, substantially in the manner described.

Second, In combination with the corner pieces, C, secured to the bottom of the stove, the top piece, D, for the purpose of holding both the corner pieces and the top slab, E, of the stove, substantially in the manner described.

Third, The combination and arrangement of the inner linings, L, with the outer slabs, B, when constructed and applied substantially as and for the purpose described.

Fourth, The combination and arrangement of the iron skeleton frame with the soap-stone sides, B, and top, E, inner linings, L, outer iron work, F, and stovepipe attachment, substantially as and for the purposes set forth.

46,456.—Car Seat Lock.—Arad Duncan and John M. Ziegler, Aurora, Ill.:

I claim the combination of the bolt, E, pin, d, cam, D, spring, a, and barrel, A, when constructed and arranged as herein specified, so that when in its operative position the said bolt will project from its case, but be free to spring within the same in closing, and when reversed will be held within its case by the action of the cam and pin.

[This invention consists in the employment or use for a car-seat lock of a revolving bolt, secured in a round case, and provided with a projection, which, by traveling on an inclined plane or cam, as the bolt rotates, cause the cam to recede in such a manner that an ordinary spring bolt or latch, with a round flanged case or barrel can be readily opened and closed by means of a key, which serves to impart to said bolt a revolving motion, and a lock is obtained which can be easily applied to a car seat, or any other article, simply by boring a hole large enough to receive the barrel, and securing the same by screws passing through suitable holes in its flanges.]

46,457.—Rotary Engines.—John R. Ellis, Co. F, 22d Regt. Wis. Vols:

I claim the revolving piston wheels, D D', which are placed eccentrically on shafts, C C', and geared together by eccentric wheels, F F', to operate in combination with the adjoining cylinders, B B', and intervening valve, E, substantially in the manner and for the purpose herein shown and described.

46,458.—Scythe Fastening.—Moses R. Flanders, Ilion, N. Y.:

I claim the scythe fastening consisting of the heel guard, A, heeband, B, heel plate, E, and heel ring, C, when constructed and combined substantially as set forth.

46,459.—Magazine Fire-arms.—Valentine Fogerty, Boston, Mass.:

I claim, first, The reciprocating grooved rack, D, suspended by cars, d, from a bar, b, and actuated by a rod, C, the said rack operating in combination with the grooved magazine, A g, to forward the cartridges, a a, as herein described.

Second, In combination with the above, I further claim the elongated holes, b, in the cars, d, to permit the vertical or lateral motion of the rack, as and for the object specified.

[This invention consists in certain improvements in the class of fire-arms known as "magazine guns," in which the cartridges are moved up to and delivered at or into the breech of the piece automatically in regular succession.]

46,460.—Sawing Machine.—Joseph Frey, Battle Creek, Mich.:

I claim the arrangement in a sawing machine of the saw, I, guide L', saw frame, L2, spring, G, levers E L4 J1, pitman, h, crank wheel H, worm, A, rod, f, pinion, B, tumbling shafts, C C', and roller, D, the whole constructed and operating substantially as herein set forth.

46,461.Machinery for breaking Quartz, &c.—Eli P. Gardiner, New York City:

I claim, first, The combination and arrangement of the arms, D D', hung upon centers at unequal distances from the faces, with the operating shaft, G, and cranks and shackle bars, H H, the whole operating together in the manner and for the purposes described.

Second, I claim the combining and arranging and operating the sieves and trough with the reciprocating arms in the manner and for the purposes specified.

46,462.—Quartz Crusher.—Perry G. Gardiner, New York City:

I claim, first, The combination and arrangement of the vibrating bush blocks, G and H, and the pillar blocks, D, operating in the manner and for the purposes described.

Second, I claim the combination of the bush blocks, double-joint and pillar blocks, with the hollow shaft and basin, acting in the manner and for the purposes described.

Third, I claim the manner of strengthening and supporting the sides of the basin by means of the bands or straps, N, having their bearings in the ring or bush block, M, whereby support is given to the basin so that it can be constructed with less weight of metal than would otherwise be required.

Fourth, I claim the combination of the vertical shaft, I, the forked arm, K, and the inclined shaft or axle, L, with the basin whereby the progressive oscillatory but not rotating motion is given to the basin by the rotation of the vertical shaft, I, as described.

Fifth, I claim the combining and arranging of a rake, P, with the inclined shaft, L, and the basin, F, so as always to be in front of the ball and to oscillate with the basin and shaft, for the purposes and in the manner described.

46,463.—Dredging Machine for Harbors and Rivers.—Andrew J. Gove, San Francisco, Cal.:

I claim the scoop or dredger, D, in combination with the scow, C, or other convenient vessel, the spars or braces, S S', the various lanyards and guys, and the compensating weights, W W, substantially as described, and for the uses and purposes as hereinbefore set forth.

46,464.—Method of Uniting Rubber Rolls to Shafts.—Wm. H. Grant, Winchendon, Mass.:

I claim the method of uniting rubber rolls to shafts substantially as set forth.

46,465.—Car Coupling.—Philip I. Gross, Manheim Center, N. Y.:

I claim the frames, C, fitted on pivots at the front of the drawbars, A, and provided each with a hook, E, attached to an arbor, c, and also provided with a vertical rod, d, in connection with the pawls, H, attached to the pivoted frames, I, all arranged in connection with springs, to operate in the manner substantially as and for the purpose herein set forth.

46,466.—Impregnating Fibrous and Porous Materials—Stuart Gwynn (assignor to Alfred B. Ely), New York City:

I claim impregnating cloth, paper, or other fibrous or porous substances with the composition above described, for the purposes set forth.

46,467.—Beehive.—John Harper, Hillsborough, Iowa:

I claim the arrangement of the comb bearers, A, stand, S, lighting board, B, and house, E F, when constructed substantially as described and for the purposes set forth.

46,468.—Harness Snap.—Horace Harris, Newark, N. J. Ante-dated Feb. 12, 1865.

I claim the extension of the spring, A, in combination with the knob, C, and the hook, B, for the purposes herein set forth.

46,469.—Railroad Ticket-holder.—J. O. Harris, Ottawa,

I claim the combination of the herein described plate, the socket or clasp, b b, and the spring or clasp, b' b', arranged and operating substantially as and for the purposes herein shown and set forth.

46,470.—Steam Engine.—Wm. Cleveland Hicks, New York City:

I claim the combination and arrangement of steam machinery operating substantially in the manner herein set forth.

46,471.—Lamp.—James Ives, Mount Carmel, Conn.:

I claim, first, A combined globe and chimney base or seat, substantially as and for the purpose set forth.

Second, So suspending the lamp and a globe and chimney that the movement of the lamp downward will cause an upward movement of both the chimney and globe, substantially as and for the purposes set forth.

Third, The rods, G G', passing through the base, D, substantially as described.

Fourth, The combination of the rods, G G' and I I', with the stay and guard plate, H, base, D, lamp, A, and chains, J J', substantially as and for the purpose set forth.

46,472.—Window-sash Supporter.—Henry F. Jenks, Providence, R. I.:

I claim the arrangement of the spring, D, the frame, C, and the hooked finger piece, E, constructed and operating substantially as described.

46,473.—Apparatus for the Manufacture of Illuminating Gas.—James Jennings, New-York City:

I claim the bench constructed substantially as described for the purpose specified.

46,474.—Combined Thrashing Machine and Straw Cutter.—Daniel Kaufman, Boiling Springs, Pa.:

I claim the combination of the toothed cylinder, C, and toothed concave, D, arranged so as to be capable of being reversed in position, and provided with teeth beveled or sharpened at one side and broad or blunt at the opposite side, to form a combined fodder cutter and thrashing machine, substantially as set forth.

[This invention consists in the employment or use of a rotating cylinder provided with teeth beveled or brought to an edge at one side, in combination with a concave provided with similar teeth and placed below the cylinder, said parts being placed within a suitable box or case, and arranged in such a manner that the device may be changed from a fodder cutter to a thrashing machine and vice versa by simply reversing the position of the cylinder and concave.]

46,475.—Friction Mechanism for the Warp Beam of Looms.—Orin Kenison and Andrew J. McClary, Lawrence, Mass.:

What we claim as our invention is the combination of the stationary bracket, M, the screw, N, and hook, O, or their mechanical equivalent or equivalents, with the lever, I, and the friction strap, F, when the latter are applied to the loom frame and the warp beam substantially as specified.

46,476.—Apparatus for Stirring and Cooling Lard.—Alexander G. Knapp, New York City:

I claim the employment or use, for the purpose of stirring and cooling lard, of the serpentine or spiral dashers, C C and D, constructed substantially in the manner herein shown and described.

46,477.—Apparatus for Inhaling Pure Air.—Benjamin I. Lane, South Framingham, Mass.:

I claim, first, The construction of the reservoir, A, with a valve, a, and hand straps, b, substantially in the manner and for the purpose described.

Second, The combination of adjustable elastic straps with the air reservoir, A, valve, a, substantially in the manner and for the purpose described, whether the straps be the means of attachment to the body or other means for this purpose be employed.

Third, The combination of the mask, C, furnished with the three contrivances, B g h, or their equivalents, with the cock, p, and reservoir, A, furnished with the valve, a, all substantially in the manner and for the purpose described.

Fourth, The device, h, for allowing the wearer of the apparatus to inhale fresh external air when it is safe to do so, in combination with an air reservoir which has its air under control of a cock, p, substantially as and for the purposes set forth.

Fifth, The use of one or more elastic straps, c c, applied to the flexible reservoir, A, for attaching the latter to the body, and also for keeping up the supply of air to the respiratory organs, substantially as described.

46,478.—Drilling Machine.—Isaac S. Lauback, New York City:

I claim, first, Combining and uniting the two adjustable brackets, Q and W, by means of the adjustable connecting rod, r, fitted with one or more universal joints, the one of said brackets to be combined with the driving head, and the other with the spindle head of the machine, substantially in the manner described for the purposes specified.

46,479.—Wood-bending Machine.—John Philip Lebzetter, Lancaster, Pa.:

I claim the winged levers, E E, held by pivots or hinges on the drum, in combination with the spring or springs, H, or their equivalent, for retaining them.

I also claim the eccentric lever, L, on its vertical shaft, F, for shifting it up and down, in combination with the slotted hook, k, wedge, P, and rod or shaft, R, arranged and operating substantially in the manner and for the purpose specified.

46,480.—Combined Seeder, Cultivator, and Roller.—James P. Long, Osage, Iowa:

I claim the combination of the seed cylinder, E, adjustable frame, F, tubes, L, and distributers, L', cultivator teeth, M, and roller, B, the several parts being arranged and operating as and for the purpose specified.

46,481.—Sash Fastener.—W. C. McGill, Cincinnati, Ohio:

I claim the arrangement of the pair of gravitating latchers, E e e', and, F f, and of the operating crank, H G, the whole being formed combined and operating substantially as set forth.

46,482.—Railroad.—Richard Montgomery, New York City:

I claim, first, The use of corrugated iron beams in the construction of aerial railroads substantially as set forth.

Second, The use of flat beams or bars of iron for connecting the ends of the rails together and also for connecting and fastening the columns of support to the cross ties in the manner and for the purpose set forth.

Third, The use of corrugated iron rails in combination with corrugated iron cross ties and corrugated iron columns of support in the construction of aerial railroads.

46,483.—Coal Stove.—James Morrison, Jr., Troy, N. Y.:

I claim, first, The employment of a vertical grate and frame, I, with the downward recess, E, and horizontal grate, o, therein in combination with the dumping and vibrating grate, F, in the manner and for the purposes substantially as herein set forth.

Second, I claim the combination with a stove a grate so constructed and arranged that the clinkers or like draught obstructing material may be removed from any point or place at or just above its surface without dumping said grate, in the manner substantially as herein described and set forth.

Third, I claim the special arrangement and combination of the iron ring, G', containing the air chamber, G, and communicating with the fire at the sides of the fire chamber by means of numerous small apertures with the tiers of fire brick, K, and, K', surrounding the fire chamber above and below the said iron ring in the manner substantially as herein set forth.

46,484.—Jack for Pegging Boots, etc.—A. W. Moore, Stafford, Conn. Antedated Feb. 12, 1865:

I claim the employment of one or more cams, F, in combination with the holder, B, and the socket plate, A, arranged and operating substantially as and for the purpose described.

46,485.—Ejector for Oil Wells.—George M. Mowbray, Titusville, Pa.:

First, I claim in ejectors for elevating liquids and other substances from wells, the combination and arrangement of the following specified parts:—first, a pipe through which to force air down into a well. Second, a surface at the bottom of such pipe to resist the air so forced down, and give it an upward motion; and, third, the combination and arrangement of the plurality of pipes and passages, whereby to divide and distribute and conduct the air upwards, so that it shall act upon the oil or other liquids, and obstructing substances in its ascent, substantially as described.

Second, I also claim the combination and arrangement of the above mentioned three parts, with an inclosing pipe, into which they are to be placed, and between the inner surface of which and the outer surface of the pipe through which air is to be forced down, the liquid to be elevated is to ascend.

Third I claim a bulb or inverted cup or nozzle, B, of any suitable form, screwed or otherwise attached to or formed upon the blast pipe and provided on its upper surface with a plurality of apertures to deliver the air in attennuated form, substantially as set forth.

Fourth, In combination with the aforesaid pipe closed at bottom, and bulb, B, with a plurality of apertures, I further claim the cup, C, adjustable in the relation to the said bulb, substantially as and for the purposes set forth.

Fifth, In combination with the blast pipe, A, I claim the cup or bulb, B, having upon its upper surface a plurality of perforations slits or tubes, surrounding the said blast pipes, substantially as and for the purposes set forth herein.

46,486.—Harvester.—W. Needham and J. Nelson, Rockford, Ill.:

First, We claim the construction and arrangement of a tubular frame substantially as and for the purpose set forth.

Second, The sockets or clamps as shown in figures 4 5 6 and 9, in combination with the tubular frame for the purposes specified.

Third, The gear frame, K', with the clamp, K, when constructed and combined with the tubular frame as described.

Fourth. The wedge washer, k, with serrated or notched faces in combination with the notched face, l', of the standard, and the notched face, j, in the clamp piece, b', as and for the purpose set forth.

Fifth, The wedge washer, r, in combination with the spring seat, R, and the standard, R', in the manner and for the purpose set forth

Sixth, The clamp levers, H' H', and clamps, h" h", in combination with the stirrup, h, for the purpose specified.

Seventh, The levers, M, spring catch, g, rack, N, pulleys, m n, in combination with the rope or chain, l, and adjustable standard, P, for the purpose set forth.

Eighth, We claim in combination with the guard bar, E, provided with the wood center piece, F, attaching the guards as and for the purpose set forth.

Ninth, We claim the combination of the adjustable dividing runner, J, the socket, F', and sleeve, I, when constructed and operating conjointly as and for the purpose set forth.

46,487.—Shirt Bosom.—John Neil, Clinton, Mass.:

I claim as a new article of manufacture the woolen shirt bosom herein before described, woven in single pattern, cut in the center and jointed at the edges all as specified.

[The object of this invention is to give an ornamental character and an elegant appearance to bosoms of woolen shirts, and it consists in making a woven ornamented shirt bosom of woolen material or its equivalent, so that the woven shirt shall have an elegant and tasteful appearance in that part exposed to view whilst the ornamental part shall have also substantially the same qualities as the rest of the shirt, or of its body, whether that be woven, knitted or felted.]

46,488.—Harvester.—Frederick Nishwitz, Brooklyn, N. Y.:

I claim, first, The combination of the stationary toothed plate, D, pinions, E F, attached to the ends of an arm, E, firmly keyed on the axle, C, with the pinion, G, on the collar, H, placed loosely on the axle and the lever wheel, I, also placed loosely on the axle and connected with the collar, H, all arranged to operate substantially as and for the purpose set forth.

Second, The lever, M', applied to the main frame, A, and in relation with the draught pole, N*, as shown, and connected to the finger bar, O, by a chain, f, all arranged to operate substantially as and for the purpose set forth.

Third, Connecting the finger bar, O, with the main frame, A, by means of a joint composed of the semi-circular recesses, g g, in the pendants, P P, and the semicircular projections, h h, an the sides of the finger bar, O, substantially as described.

Fourth, The shoe, S, arranged and applied to the main frame, A, relatively with the pitman, N, and finger bar, O, to operate substantially as and for the purpose specified.

46,489.—Harness Saddle Tree.—Oliver B. North, New Haven, Conn.:

I claim, first, A metallic saddle tree for harness, composed of the jockeys, cantel and seat, cast in separate pieces, and united together substantially in the manner and for the purpose described.

I also claim casting a stud upon the underside of the seat for the purpose of uniting said seat to the cantel without passing rivets or screws through, which interfere with and mar the plating or japanning as herein described.

I also claim uniting the check hook to the tree by passing the shank of the hook under the bow of the jockeys, and above the frame, and uniting it by the stud or pin, f, and the screw and nut, g b, or their equivalent devices substantially as herein described and represented

46,490.—Projectile.—Thomas G. Orwig, New York City:

I claim, first, The telescopic tubes, g g, adapted to slide and rotate one within another, in the described combination with the ball, A, stem, f, and wings, h h, all arranged and operating in the manner and for the purposes set forth.

Second, The combination of the perforated cap, B, with the winged telescope stem, E, soft metal ring, C, projectile, A, and cartridge bag, D, constructed and operating substantially as and for the purpose described.

46,491.—Heating Carving Table.—Samuel Patrick, Galesburg, Ill.:

First, I claim a carving table which is provided with a series of pans of varying depths that communicate with each other and also with a boiler substantially as described.

Second, Distributing water of different temperatures through a series of pans by producing a circulation, substantially as herein described.

46,492.—Amalgamator.—C. C. Peck, Black Hawk, Colorado Ter.:

I claim, first, the pan, B, constructed in the form and style shown and described.

Second, A series of pans arranged to operate in the manner and for the purpose set forth.

Third, The spider, m, provided with the bearing, n, and arm, h, substantially as shown and described.

Fourth, The suspended platform, A, arranged to vibrate vertically and longitudinally as and for the purpose set forth.

Fifth, I claim so arranging an amalgamator pan as to give to it the three-fold motion substantially as and for the purpose set forth.

46,493.—Stock Feeder.—Thomas W. Pierce, Richfield, Minn.:

I claim the shaft, F, mounted within the chest, A, in the manner described and provided with cups which by the rotation of the shaft are filled and discharged, substantially as and for the purpose set forth.

Second, I claim the spring, L, and knob, M, in combination with the notch or recess, N, for holding the shaft, F, against rotation when the feeding operation is suspended.

46,494.—Eye Water.—Mary Pike, Cornish, N. H.:

I claim an eye water or lotion, composed of the sulphate of zinc, and chloride of sodium mixed together and dissolved in water about in the proportion herein set forth.

[This invention consists in a mixture of sulphate of zinc, (white vitriol,) and chloride of sodium (rock salt), dissolved in water.]

46,495.—Roofing Composition.—Wm. L. Potter, Clifton Park, N. Y.:

I claim the use of pulverized slate rock for roofing, covering the sides of buildings, boat decks, etc., as set forth and described.

46,496.—Universal Timepiece.—W. B. Purdy, Huntingdon, Penn.:

I claim the application of two or more sets of hands, a^s a'^s b^s b'^s, and so forth, secured to a common center, g, and operating in combination with two or more concentric dials, a b, etc., substantially as and for the purpose set forth.

[This invention consists in the application of two or more sets of hands working on the same center in combination with a corresponding number of concentric dials in such a manner that by the several sets of hands working on several dials the time of two or more places of different longitude can be indicated simultaneously and each set of hands can be readily set to indicate the time of any place on the globe independent of the remaining set or sets.]

46,497.—Skates.—Washburn Race, Lockport, N. Y.:

I claim the combination of the heel screw, c, bearing, a, and nut, f, with the bed, A, and runner, B, substantially as and for the purposes herein described.

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46,498.—Bag Holder.—Robert Ramsey, New Wilmington, Penn.:

I claim forming the expanding spring, A2, in one piece of metal with the spreaders, A A', substantially as and for the purpose set forth.

Second, I claim the screw bolt, C, and nut, E, employed in combination with the spreaders, A A', and hooks, f f, in the manner and for the object herein before stated.

46,499.—Stove Drum.—Thomas Roberts, Shelby, Ohio.:

I claim the cone end chambers or sections, E, and, E', annular chamber, D, and the lever, F, in combination with the tubes or pipes, m, and n, damper, B'', and drum when arranged and operating conjointly, substantially as and for the purposes set forth.

46,500.—Heat Radiator.—Herman Rugee, Milwaukee, Wis.:

I claim the adjustable segment wings forming an inverted cone in combination with the crank, links or rods for adjusting the wings, substantially as shown and described.

46,501.—Machine for Holding Hubs while being Bored.—Peter Schutler, Chicago, Ill.:

First, I claim the application of a screw ring, D, which is provided with clamps, c c c, to a holder, C, which is applied to a rotating shaft, B, substantially as described.

46,502.—Harvester.—Jacob Leibel, Manlius, Ill.:

I claim, first, the centrally arranged receiver, o, constructed as described in combination with the two endless aprons revolving towards the center of the machine, and depositing the grain in said receiver, substantially as and for the purposes specified and shown.

Second, The platform, Q, provided with the space, l, when arranged in relation to the main frame and endless apron substantially as and for the purposes specified.

Third, Providing a harvesting machine with the raker's stand, P, and the builder's stands, R and S, when arranged on the main frame of the machine near the center thereof, substantially as and for the purposes herein described.

46,503.—Rotary Photographic plate Holder.—Charles H. Shute, Edgartown, Mass.:

I claim the combination of the photographic dark slide, A, having an orifice, B, and slide, C, with the rotating box carrying the plate and pierced in its face with a series of openings to correspond with the opening, B, as they are alternately exposed to it, the said box being rotated by a lever, by means of a pin working into a ratchet on the back of the lid, G, the circle of the ratchet wheel being divided to correspond with the orifices in the face of the rotating box.

[The object of this invention is to facilitate the taking of several different pictures upon one prepared or neutralized plate. By a very ingenious arrangement of parts the plate is made to rotate so as to bring successive portions before the lens. The invention is particularly applicable to ferrotypes.]

46,504.—Rivets.—John W. Smith, Boston, Mass.:

I claim a rivet constructed with a recess in its end, substantially as and for the purpose herein specified.

46,505.—Tobacco Pipe Stem.—Thomas Smith and Henry J. Brown, Detroit, Mich.:

I claim the combination of the stem, B B, chamber, c c, and tubes, D E, and the cap, F, all constructed and operating substantially as and for the purpose set forth.

46,506.—Construction of Ordnance.—Charles W. Stafford, Old Saybrook, Conn.:

First, I claim in combination with the cast main body, A, of a piece of ordnance, two or more bands (trunnion and reinforce) when secured and strengthened with longitudinally projecting tongue, r, and corresponding grooves, in the manner as herein represented.

Second, I claim the combination of the trunnion band, U, adapted to slip on over the breech, the flange, u, projecting inward from the said trunnion band, the shoulder, a, preventing forward displacement of the trunnion band, and one or more reinforce bands, R, securing it against backward displacement, substantially as herein described.

46,507.—Flexible Tubing for Illuminating Gas.—Wm. B. S. Taylor, New York City:

I claim the use and application of glue or glue composition in the tubing, substantially as described, for the purpose of making the flexible tubing gas tight, whether of cloth or rubber or other gum.

46,508.—Machine for Cutting Barrel Heads.—C. R. Tompkins, Rochester, N. Y.:

I claim, first, The combination and relative arrangement of the rock shaft, P, and lever, K, with the upper and lower boxes, f and f', of the adjustable feed roller, d, substantially in the manner shown and for the purpose of producing a parallel adjustment of the said roller.

Second, In combination with the adjustable pawl arm, y, and ratchet, a, the crank, J, and slotted connecting rod, R, substantially in the manner shown, and for the purpose of producing the intermittent feed as set forth.

46,509.—Coils for Steam Heating Apparatus.—John Trageser, New York City:

I claim, first, The arrangement of the pipes, f i and k, whereby the axial pipe, k, is allowed to expand or contract without injury to the joints as set forth.

Second, I claim the T pipes, d and l, in combination with the coil, p, and couplings, whereby said coil can be twined up as specified.

Third, I claim the conical ground couplings, applied substantially as specified to the coils of steam heating and boiling apparatus, so that said coils will be kept steam tight at the joints and motion allowed for turning said coils up as set forth.

46,510.—Curry Brush or Card.—John Voak, Penn Yan, N. Y.:

I claim the frame, A, handle, a, shoulder rest, a', and gearing C B, in combination with the brush E, and receptacle, F, the several parts being constructed, arranged, and operated as set forth.

46,511.—Microscope.—William Wales, Fort Lee, N. J.:

I claim the application of two or more back lenses or correctors in combination with the same microscope object glass constructed and operating substantially as and for the purpose set forth.

[This invention consists in the application of two or more back lenses or correctors in combination with the same microscope object glass, in such a manner that the angle of aperture left for natural reflected light is equal to that for oblique or angular light in contradistinction to the use of two or more front lenses which have to be changed and shifted to be adapted to central and oblique light.

46,512.—Retainer for Window Sash.—John H. Weeks, Philadelphia, Pa.:

I claim the combination of the lever, E, its knob, G, and arm or projection, e, the spring, k, bolt, D, and its lip, c, the whole being constructed, applied to a sash, and arranged for joint action as and for the purpose herein set forth.

46,513.—Device for Equalizing the Delivery of Thread from Shuttles and Spools of Sewing Machines.—William Weitling, New York City:

I claim the application to the spool or bobbin in a shuttle or other part of a sewing machine of a thread leader having a motion in the arc of a circle, and constructed and operated substantially in the manner and for the purpose described.

46,514.—Apparatus for Softening the Gum of Adhesive Labels.—Benjamin Wilder, North Scituate, Mass.:

I claim as my invention the apparatus, substantially as and for the purpose described.

46,515.—Apparatus for Distributing Fertilizers.—J. M. Wiltsie, Pittsford, N. Y.:

I claim, first, The swinging self-locking bail or handle, B, applied and operated in the manner and for the purpose specified.

Second, The application of the bars, C, in distributors for lime and other fine fertilizers, to be used by hand, as shown and for the purposes set forth.

Third, Arranging the register plate, D, within the case as shown, and for the purposes described.

46,516.—Operating Ordnance on Gun Boats, &c.—William Louis Winans, Baltimore, Md.:

I claim mounting the carriage of a gun on a platform which is connected with a plunger to be elevated by the admission of steam to the cylinder, substantially as described, in combination with the connection of the said platform with other plungers fitted to cylinders to regulate the descent of the platform and gun by the flow of water or other fluid, substantially as described and for the purpose specified.

I also claim making the plungers for regulating the descent of the platform and gun with a cavity in the lower end thereof to retain air, substantially as described, to act as a spring cushion to receive sudden and violent concussions, as set forth.

I also claim in combination with the mounting of a gun on a platform to be raised and depressed, the employment of a chassis connected with the platform and interposed between it and the carriage, and provided with wedges or the equivalent thereof to vary the inclination of the chassis, substantially as and for the purpose specified.

I also claim connecting the upper part of the carriage in which the gun is mounted with the lower part thereof by means of a a swivel in combination with the chasis connected with the movable platform by which the gun is raised to be fired, and let down to be reloaded, substantially as and for the purpose described, whereby the gun can be turned to take any range desired, notwithstanding the platform by reason of its connections can not be turned.

And I also claim in combination with the platform for raising and letting down the gun, as described, the employment of sliding hatchways so connected with the platform as to be operated by the motions of the platform, substantially as and for the purpose specified.

46,517.—Well Borers.—George L. Witsil and Edward Burke, Philadelphia, Pa.:

We claim, first, The employment of two or more augers in combination with a central upward discharging drill, substantially as described.

Second, connecting the augers, A A a', to the drill collar, N, in such manner that the augers can be rotated independently of the drill, or can be made to rotate the drill, at pleasure, substantially as described.

Third, The center drill point, C, plowing cutters, B B b, collar, N, and the right and left twisted elevators, A A a', combined and operated substantially as herein described.

Fourth, Feeding the augers down to their work by means of right and left screws, p p' p p, applied and operating substantially as described.

46,518.—Preparing Barrels to Hold Oil, Petroleum, &c.—Henry Wurtz, New York City:

I claim, first, The introduction into the pores of wood and other porous materials, when used as materials for barrels or other vessels for holding oils, of aqueous solutions of deliquescent salts, as above set forth.

Second, The subsequent superficial application to such substances or agents which convert the deliquescent salts into insoluble compounds, as above set forth.

Third, The method of preparing barrels and other vessels composed of wooden staves bound by hoops for holding oils by filling them with deliquescent saline solutions and tightening the hoops as the wood shrinks by absorption of the liquid, as above set forth.

Fourth, The prevention of the corrosion of iron hoops, nails and other iron fastenings of barrels and other vessels for holding oils when impregnated with solutions of deliquescent salts by adding to such solutions sucrate of lime, as above set forth.

Fifth, The application to the internal surface and between the joints of barrels and other vessels for holding oils of a paste composed of deliquescent saline solution combined with some substance of a gelatinous, glutinous, mucilaginous, farinaceous, gummy or starchy nature as above set forth.

46,519.—Ticket Holder.—Varnum G. Arnold, Boston, Mass., assignor to himself and Chas. G. Bird, Roxbury, Mass.:

I claim a holder or case for passage tickets, constructed with a delivery duct, in combination with an aperature, A, in the side of the same, for delivering the tickets one by one by the action of the thumb, substantially as herein described, for the purpose specified.

46,520.—Roasting and Desulphurizing Ore.—Hezekiah Bradford, New York City, assignor to Horatio Bogart. Ante-dated Feb. 16, 1865:

First, I claim the process, substantially as herein described, of treating metallic ores in a finely divided or pulverized state, in a chamber with jets of superheated steam, or heated air, or both, jointly forced through the charge, substantially as and for the purposes specified.

Second, I claim retaining the fine particles of ore that pass off from the ore chamber with the steam air or gases, by passing the same into or through water, substantially as set forth.

Third, I claim discharging the finely-pulverized ore from the ore chamber through a pipe into a vessel or reservoir of water by the pressure of the air gas or steam, substantially as set forth.

46,521.—Milling Machine.—Joseph R. Brown (assignor to Brown & Sharpe), Providence, R. I.:

First, I claim the combination of the elevating knee, H, the sliding plate, E, the swivel plate, L, and sliding carriage, G, with the revolving cutter head, constructed and arranged to operate substantially as described.

Second, The arrangement of the center spindle, b, or its equivalent, with the devices which actuate and govern the movements of the same, in combination with the sliding carriage, G, and the devices by which it is operated, so that the two mechanisms may operate either separately or conjointly, substantially in the manner described.

Third, I claim the arrangement within the center head, F, of the swinging block, R, or its equivalent, and the revolving spindle, b, with the devices which operate the same, substantially as described, for the purpose specified.

46,522.—Machine for Cutting Pasteboard for Boxes.—Elizur E. Clarke (assignor to Franklin N. Clarke), New Haven, Conn.:

I claim the method of holding and adjusting the cutter without the employment of the cutter stock, by combining with the cutter bar, having two side grooves and one tap groove, a cutter holder slotted or grooved vertically for adjustment on a binding bolt, and horizontally-sliding cross or T-stud, together with the horizontally-sliding form and collar screw, for the vertical adjustment of the cutters, substantially as set forth.

I also claim the attachment to the cutter bar of the parallel or horizontal beam or cap, set at a distance apart, to admit of the groove of the screw nut, in combination with grooves in both the said cutter bar and beam, to admit of the collar of the screw nut, the whole being arranged for operation substantially as set forth.

I also claim the mode herein described of locating and holding a rule or scale in its proper relation with respect to the cutter, by combining with the cutter bar and uprights, brackets or the equivalents thereof, in the manner substantially as hereinbefore shown and described.

46,523.—Grain Drill.—J. W. H. Doubler (assignor to himself and John E. Wynne), Warren, Ill. Ante-dated Feb. 6, 1865:

First, I claim the hollow drills, F G, constructed, arranged and operating as and for the purposes herein specified and shown.

Second, I claim the combination of the drills aforesaid with the adjustable bar, H, and lever, g, arranged and operating substantially as and for the purposes shown and described.

Third, In combination with the above, I claim the parallel bar, L, and the chains, p, arranged and operating as and for the purposes set forth.

Fourth, I claim the curved arms, J, provided with the slot, j, and set screw, k, arranged as and for the purposes specified.

Fifth, I claim providing the spiral distribution, D, with the several bearings, f f, so as to divide the same into separate compartments, substantially as and for the purposes herein delineated and set forth.

46,524.—Carriage Wheels.—Joseph Goodman, Blackfriar's Road, Eng., assignor to Charles P. Button, New York City:

I claim the disk, I, with conical central bars, J, in combination with the grooved disk, L, and its central openings, a, and with the spokes, C, and felly or tire, D, constructed and operating substantially as herein described, so that by screwing the two plates together the spokes are forced out to a uniform distance from the center and securely clamped.

[This invention consists in the employment or use of a disk, with a conical central bore, in combination with a grooved plate and its central opening, and with the spokes and felly or tire of a wheel, in such a manner that by screwing the disk and plate together the spokes are forced out to a uniform distance from the center, and securely clamped, and the felly or tire is equally strained throughout the whole circumference and brought in the position of a true circle.]

46,525.—Mosaic Toy Block.—Thos. Geo. Harold (assignor to himself and Nelson Stafford), Brooklyn, N. Y.:

I claim a series of square or cubical blocks, whose surfaces are colored in triangular forms, as and for the purposes specified.

46,526.—Tuyer.—John R. Harrington (assignor to Agnes V. Harrington), Brooklyn, N. Y.:

In combination with the box, A, provided with the projection, a, and tube, a3, I claim the back, B, provided with the tube, b3, when the same shall be combined and operated in the manner and for the purpose specified.

46,527.—Gas-heater or Blow-pipe for Heating Soldering Irons.—Edwin A. Leland (assignor to Radcliffe B. Lockwood), New York City:

I claim the new article of manufacture, consisting of a gas furnace or blow-pipe, constructed substantially in the manner described, for the purpose of heating soldering tools, and for other similar purposes.

46,528.—Coat and Hat Rack.—Samuel Macferran and Stephen Ustick (assignors to Samuel Macferran), Philadelphia, Pa.:

We claim the combination of the segmental or elliptical bar, A, the hook, B, the bracket, C, and hook, B', substantially in the manner described and for the purpose above set forth.

46,529.—Spring Horse.—Henry F. Metzler (assignor to himself and Thos. G. Cowperthwaite,) New York City:

I claim the manner in which the standards are arranged, combined, operated and adjusted relatively to their several parts and to the horse baby-tender or chair, whereby the several motions as described are obtained.

46,530.—Roving Frame.—Thomas Mayor, Pawtucket, R. I., assignor to George Chatterton, Providence, R. I.:

I claim the construction and mode of arranging the bolster with the spindle and the transverse rail or its equivalent, substantially as described for the purpose specified.

46,531.—Lock.—Lyman F. Munger, Rochester, N. Y., assignor to himself and Walter K. Marvin, New York City:

I claim, first, The combination in a lock case of frictional key tumblers, bolt and fence tumbler, together with the follower or lever to actuate the same under the arrangement herein described, so that both the said key tumblers and bolt when actuated shall move in planes parallel to each other, substantially as set forth.

Second, In combination with horizontally sliding key tumblers and double-gated bolt, I claim the double-acting fence tumbler operating as described, so as to lock the bolt when her shot out or withdrawn, substantially as set forth.

Third, The method herein described of operating the key tumblers by forming a cam groove in the fence tumbler, in combination with a pin passing through and projecting from the said key tumblers, the whole being arranged for operation substantially as set forth.

46,532.—Breech-loading Fire-arms.—Joseph Rider, Newark, Ohio, assignor to himself and E. Remington & Sons, Ilion, N. Y.:

I claim, first, Combining with a hammer that is hung upon the side of the arm, and moves at right angles to the bore of the gun, a nose or projection, which, shooting into a mortise through the barrel, forms a breech piece, substantially as and for the purpose described.

I also claim combining with such a hammer, or the projection thereon, a pivoted trigger or lever, for striking or impinging upon the cartridge, and thus explode it simultaneously with the closing of the arm, substantially as herein described.

46,533.—Steam Boiler.—E. B. Sintzenich (assignor to himself and Joseph Hall), Rochester, N. Y.:

I claim, first, The arrangement of the water flues centrally within the horizontal fire or combustion flues of marine boilers, as shown, and for the purposes set forth.

Second, The combination and relative arrangement of the manhole, D, with the horizontal return fire or combustion flues and their water flues, the latter having their front ends connected with the water space surrounding the combustion chamber, I, substantially as shown and described, and for the purpose herein set forth.

46,534.—Shade-holder for Lamps.—Cornelius St. John (assignor to Roscoe G. Turner, assignor to Charles C. Beers), Boston, Mass.:

I claim the spring support, C, in combination with a socket, D, operating substantially in the manner and for the purpose set forth.

45,535.—Means for Applying Heat and Cold in the Treatment of Diseases.—John Chapman, M. D., Somerset street, Putnam square, London, Eng.:

I claim the manner of applying heat and cold, solids or fluids, by means of "spine bags," composed of india-rubber or other waterproof flexible material, when said bags are divided into two or more cells or compartments, whether such cells or compartments are formed by the pressure of clamps upon the exterior or by the use of one or more interior partitions.

I also claim spine bags for making hot applications, when such bags are composed of two or more tubular compartments.

46,536.—Furnace for Burning Gas.—Carl Schinz, Offenburg, Grand Duchy of Baden:

I claim, first, The employment or use of the gas splitter, G, with two or more tuyeres, k, in combination with the generator, C, air inlet, i, and combustion flue, o, or its equivalent, constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The employment or use of two or more air tuyeres, i, in combination with the channel, F, rising from the generator, C, and with the combustion flue, o, or its equivalent, constructed and operating substantially as and for the purpose set forth.

Third, The employment or use of two or more combustion flues, o, proportioned according to the rules above specified, and arranged in combination with the gas channel, F, and air channel or channels, i, substantially in the manner and for the purpose set forth.

Fourth, The application of a window, J, in front, and one or more loopholes, q, in the rear of the combustion flues, o, substantially as and for the purpose specified.

[The object of gas-burning furnaces and stoves is to obtain the largest possible useful effect of the fuel. This purpose is effected because this system offers the means, 1, to produce the dry products of distillation obtained from the fuel more regularly than the direct mode of firing; 2, to effect a complete combustion of all the combustible materials; 3, to commingle the oxygen of the atmospheric air and the combustible materials in the proper proportion, and consequently neither a surplus of combustible gases nor of air exists, and the maximum effect of initial temperature resulting from the products of combustion is obtained.]

RE-ISSUES.

1,875.—Automatic Grain Binder.—Robert D. Brown, Covington, Ind. Patented April 7, 1863:

First, In combination with a cradle, B, of any suitable construction, I claim the arms, C C', attached to shafts, c c, geared together by wheels, c', and rotated at proper intervals by a cogged segment, c5, to elevate the arms, C C', and carry the band around the compressed gavel.

Second, The combination of the cam wheel, c2, with the arms, C C', for securing the band in the jaws, c4.

Third, In combination with the arms, C C', constructed and operating substantially as herein described, I claim the employment or use of two pairs of griping or twisting jaws, D D, attached by separate pivots, d, to a common journal, D', and operating substantially as and for the purpose set forth.

Fourth, Driving the jaws, D, by the shaft, E, working within the hollow journal, D', in the manner explained, to compress the said jaws with force corresponding with that required to rotate them.

Fifth, The combination of the spring stop, k2, cam l2, and wheels, I and K, when the said parts are constructed, arranged and operated in the manner and for the purposes herein specified.

Sixth, The tucking hand, f, advanced and rotated substantially as

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described for the purpose of tucking the twisted ends under the band.

Seventh, Holding the band against the pressure of the tucking band by means of the claw, f, or its equivalent, substantially as described.

Eighth, The combination and arrangement of the shafts, F F', yokes, f2, pinions, f3 f4, guides, H, and segment racks, h, to impart the required motion to the tucker, f, and claw, f1, substantially as set forth.

Ninth, The arm, G, provided with a cogged segment, g', and employed to advance the shafts, F F', intermittently, in the manner and for the purposes explained.

Tenth, The segment co wheel, I i i', constructed as described, in combination with the twisting jaws, D, and tucker, f, or their equivalents.

Eleventh, The arm, L, or its described equivalent, for casting the finished sheaf, substantially as explained, when used in the described combination with the pivoted table, N or N2, or other suitable receptacle for carrying the sheaves and depositing them in heaps.

Twelfth, The curtain, P or P2, operated by the falling and rising of the table, N or N2, in manner substantially as and for the purposes set forth.

Thirteenth, The mode of combining the worm, s2, and slotted disk, O, or any substantially equivalent devices, for counting the number of sheaves to be deposited in each heap, with an automatic binding machine, substantially as herein described.

Fourteenth, The combination of the sheaf-holder, B B', or equivalent device, with rotating griping jaws for twisting the band, and the tucking hand and holder, as described.

1,876.—Raking Attachment to Harvester.—Robert D. Brown, Covington, Ind. Patented April 7, 1863:

I claim, first, The continuously revolving rake, B, carried forward over the platform and back beneath the same by means of driving chains, bolts, or their equivalent, and elevated to its working position during its forward motion and retracted in passing beneath the platform by means of the crank and D, or its equivalent, working in a slot for the purposes specified.

Second, The intermittent cradle, F f, operated as described, in combination with the continuously revolving rake, B, for the purposes set forth.

1,877.—Steam Engine.—Fred'k P. Dimpfel, New York City. Patented July 1, 1851.

I claim, first, The means herein described for connecting the steam piston of a steam engine with the crank thereof, said means consisting of a piston rod, fixed crosshead, side bars, forked connecting rod and belts, or the equivalents thereof, the several devices being arranged and operating substantially as herein set forth, in such manner that the crosspiece of the connecting rod which is placed transversely to the crank shaft shall be on opposite sides of the axial line of said shaft at opposite extremities of the stroke of the piston.

Second, The forming of the eduction and induction chambers in cylinder heads of steam engines, and furnishing them respectively with supply and exhaust valves, substantially in the manner and for the purposes described.

Third, The forming of two steam chambers in one or both heads of a steam engine cylinder in combination with induction and eduction steam pipes, and with puppet or other valves, in such manner that a large portion of the steam shall be saved which is lost or wasted in the nozzles or steam ways of engines as ordinarily constructed, substantially as described.

Fourth, The removable chambered cylinder head, in combination with the extension chambers, u u, and steam pipes, r r, connected to the latter, substantially as and for the purposes described.

Fifth, The manner, substantially as described, of applying the induction and eduction valves with their respective chambers to steam cylinders, for the purpose set forth.

1,878.—Condenser.—Wm. A. Lighthall, New York City. Patented Dec. 17, 1861:

I claim securing the packing rings, C, or their equivalents or substitutes, as herein described, in the apertures. B, in the head sheet, A, around the ends of the tubes, D, without the use of a follower or other analogous mechanical device or arrangement, as herein set forth.

1,879.—Portable Water Condenser.—Wm. A. Lighthall, New York City. Patented July 29, 1862:

I claim, first, The combination of the tank, N, filter, B, condenser, F, and heater, G, when arranged in relation to each other in the manner and for the purposes herein set forth.

Second, The construction of the case of the condenser, F, with spaces above and below the series of tubes, K, as and for the purposes set forth.

1,880.—Naval Ram for the destruction of the Enemy's Ships.—Charles Perley, New York City. Patented Feb. 24, 1863:

First, In combination with a horn or ram capable of being projected from or drawn into a vessel below the water line, I claim a valve gate or gates to close the orifice when the same is removed, as specified.

Second, I claim a cutting edge provided at the end of a horn or ram to prevent the same glancing off when striking diagonally against an opposing vessel, as set forth.

Third, In combination with a movable horn or ram, I claim a weight or mass of material employed behind said horn or ram, but separate from the vessel itself, and acting to drive the horn into the vessel to be destroyed, substantially as set forth.

1,881.—Machine for Cutting Files.—Milton D. Whipple (assignor by mesne assignments to the Whipple File Manufacturing Company), Cambridge, Mass. Patented Oct. 7, 1856:

I claim feeding the blank forward and rotating it upon its axis as the cutting proceeds, when it is operated upon by the vibrating cutters in the manner substantially as herein set forth.

I also claim supporting one end of the blank in a socket that is free to move with it and to accommodate itself to blanks of various lengths, substantially as set forth.

I also claim, in combination with a round blank that is rotated for the purposes described, operating upon the blank immediately beyond its point of support, in the manner and for the purpose substantially as herein described.

I also claim the method herein described of operating the cutters by means of the wipers, b, and the springs, A2 and Z, whereby the force of the blow is diminished as the size of the blank decreases, as set forth.

I also claim forming the cutters of circular disks, or of portions thereof, in the manner and for the purpose substantially as herein set forth.

DESIGNS.

2,032.—Agricultural Furnace.—Merritt Peckham, Utica, N. Y..

2,033.—Spoon and Fork Handle.—Julius L. D. Sullivan, Somerville, Mass.:

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired,

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

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Notes and Queries

D. T., of Pa.—Your plan for raising sunken vessels, by securing steam boilers to their sides and then pumping the wate out of the boilers, is essentially the same as one in common use with the difference that stout wooden casks are employed instead of iron boilers.

M. W., of N. J.—We know of no treatise on the manufacture of pistols. Booth's, Muspratt's, or any other large work on chemistry, will give you full directions for making fulminating powders. No one should attempt this dangerous operation who is not accustomed to chemical manipulations.

J. M. M., of N. Y.—Inventors frequently prejudice persons disposed to use their machinery by incredible statements. No boiler in existence "will save nine-tenths" of the fuel required to run another boiler of similar capacity.

D. S., of Pa.—It seems to us that the crank motion is beautifully adapted to the steam engine, as with a constant motion of the crank the motion of the piston is slow at the ends and rapid in the middle of the stroke, just as is desired. We should be surprised if any properly-conducted experiment should show other modes of converting rectilinear into rotary motion to be more economical.

G. R., of Mass.—You can obtain asbestus of Julius G. Phole, M. D., analytical chemist, successor to Dr. Chilton, No. 93 Prince street, New York.

G. E. S., of Cal.—The uses of asbestus are very few and the demand small. If that in your locality has a fine, strong fiber you might possibly find a market for it by writing to Schieffelin Brothers, of this city.

T. J. W., of N. Y.—In the perfect combustion of coal one atom of carbon combines with two atoms of oxygen to form carbonic acid, $C O_2$. The weight of the carbon atom is 6, and of the oxygen 8, so the proportion is 6 pounds of carbon to 16 of oxygen. The weight of 100 cubic inches of air is 31 grains, and the proportion of oxygen is 22 76-100ths per cent. From these data you can make your own calculations.

C. R. W., of Ill.—We should think a caloric engine would answer your purpose if you have no more machinery to rive than what you state.

W. H. F., of Mass.—You inquire whether certain tools in our article under that head are new or old. We can tell better when we know what tools you mean.

C. B. S., of Conn.—All pumps require more or less attention. If any man sells you a machine of any kind and says it requires no attention he makes a rash statement.

D. R. W., of Maine.—We have no faith in recutting files with sulphuric acid. No durability is found in files so treated.

J. H. J., of Ohio.—We have our own opinion in regard to the discoveries claimed for Swedenborg, but we do not introduce discussions into the SCIENTIFIC AMERICAN which are likely to promote sectarian controversy.

W. C. C., of N. Y.—You had better write to the Commissioner of Agriculture, at Washington, for information about tobacco seed.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 15, to Wednesday, February 22, 1865:—

R. R., of N. Y., $5; G. & H., of N. Y., $30; C. W. C., of N. Y., $12; J. A. M., of N. Y., $25; W. H. L., of N. Y., $30; C. F., of N. Y., $12; J. P. B., of N. Y., $25; B. M. S., of N. Y., $25; J. W. C., of N. Y., $12; N. E. B., of N. Y., $25; L. E., of N. Y., $35; W. W., of N. Y., $15; B. & S., of Conn., $80; B. D. S., of Va., $70; F. L., of Ohio, $20; G. Q. P., of N. Y., $30; W. M. S., of N. Y., $15; F. & D., of Mass., $20; W. R. T., of Pa., $20; J. G. V., of Conn., $20; F. & W., of N. Y., $20; J. Z., of N. Y., $70; J. A., of N. H., $20; W. H., of Del., $20; J. H., of N. Y., $20; H. H. E., of Conn., $20; R. A., of Ohio, $20; J. K., of N. Y., $20; J. B., of N. Y., $20; J. C. M., of Ohio, $20; D. F. W., of Ky., $20; J. N. P., of N. Y., $90; J. R., of Ind., $2); H. Z., of N. Y., $20; A. A. M., of N. Y., $20; L. B., of N. Y., $15; W. G. M., of N. Y., $20; E. H., of N. Y., $40; F. M. C. DeV., of N. Y., $22; W. H., of N. Y., $20; G. F. S., of N. Y., $45; A. E., of Ohio, $20; A. B., of Ohio, $20; J. L., of Mass., $20; B. & M., of N. Y., $45; L. C. F., of Ill., $55; H. G. W., of Iowa, $45; J. H., of N. Y., $20; B. & W., of Ind., $40; L. D., of N. Y., $15; J. M. D., of N. Y., $15; A. H., of N. Y., $136; B. O., of N. Y., $15; H. B., of Iowa, $20; D. S., of Mass., $20; M. B. D., of N. Y., $50; L. J. R., of N. Y., $50; B. & B., of N. Y., $15; W. C. H., of N. Y., $22; M. K., of N. J., $22; T. L. L., of R. I., $20; C. & D., of Ill., $22; J. W. B., of N. Y., $15; R. N., of N. Y., $45; W. L. F., of N. Y., $15; A. W. H., of N. Y., $20; J. M. C., of Mass., $35; S. T., of N. Y., $20; J. L. T., of Mass., $20; J. & S., of Conn., $20; W. S. McN., of Conn., $15; J. M. C., of Mass., $23; C. F., of N. Y., $20; F. G. H., of Mass., $15; L. G. F., of N. Y., $15; E. L. C., of N. Y., $45; G. S., of N. Y., $15; L. R. B., of N. J., $15; L. & B., of Ohio, $250; T. S., of Conn., $15; J. M. R., of N. J., $50; W. & C., of N. J., $25; C. C. T., of Me., $30; H. O. C., of Eng., $16; L. R., of N. Y., $25; J. L., of Ohio, $15; J. K., of Iowa, $15; J. M., of Mass., $16; J. C. C., of Conn., $25; H. & R., of Ohio, $16; J. E. M., of Wis., $15; K. & M., of Pa., $10; W. O. B., of N. J., $25; I. W. L., of N. Y., $27; N. H., of N. Y., $15; J. E. Y., of Pa., $16; F. G. J., of N. Y., $290; J. S. G., of Me., $25; J. R. C., of N. Y., $15; J. F., of N. Y., $15; R. B., of N. J., $15; J. L. K., of Pa., $15; J. S., of N. Y., $15; J. H., of N. H., $15; J. S. B., of N. Y., $136; T. L. M., of Ohio, $21; L. H. H., of N. Y., $207; A. W. F., of Vt., $25; P. C. R., of Mass., $15; W. N., of Conn., $10; J. W. A., of Ill., $15; M. R. S., of Ohio, $16; S. & H., of Ind., $16; S. S. D., of Wis., $25; T. B. G., of U. S. N., $50; T. J. B., of Tenn., $20; C. N., of Ill., $25; S. B., of Pa., $10; D. C., of Wis., $25; J. H. T., of Nebraska, $16; T. W. C., of N. H., $16; D. & S., of Pa., $16; J. A., of Wis., $21; J. B., of Ill., $20; H. G. H., of Mass., $10; N. E. B., of N. Y., $25; P. & B., of N. Y., $25; C. W. C., of Mass., $16; A. K. F., of La., $75; E. S. H., of Mass., $25; W. C., of Mass., $30; A. H. N., of Mass., $25; G. A. H., of Mass., $16; J. B. K., of N. Y., $15; A. & L., of Pa., $15; W. W., Jr., of Del., $46; C. & R., of N. Y., $25; H. C. S., of Me., $25; J. R., of Pa., $15; G. F. W., of Mass., $40; W. & T., of Vt., $25; C. G., of Mass., $25; J. A. M., of Mass., $40; E. B., Jr., of R. I., $15; C. H., of N. Y., $25; E. W., of Me., $10.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 15, to Wednesday, Feb. 22, 1865:—

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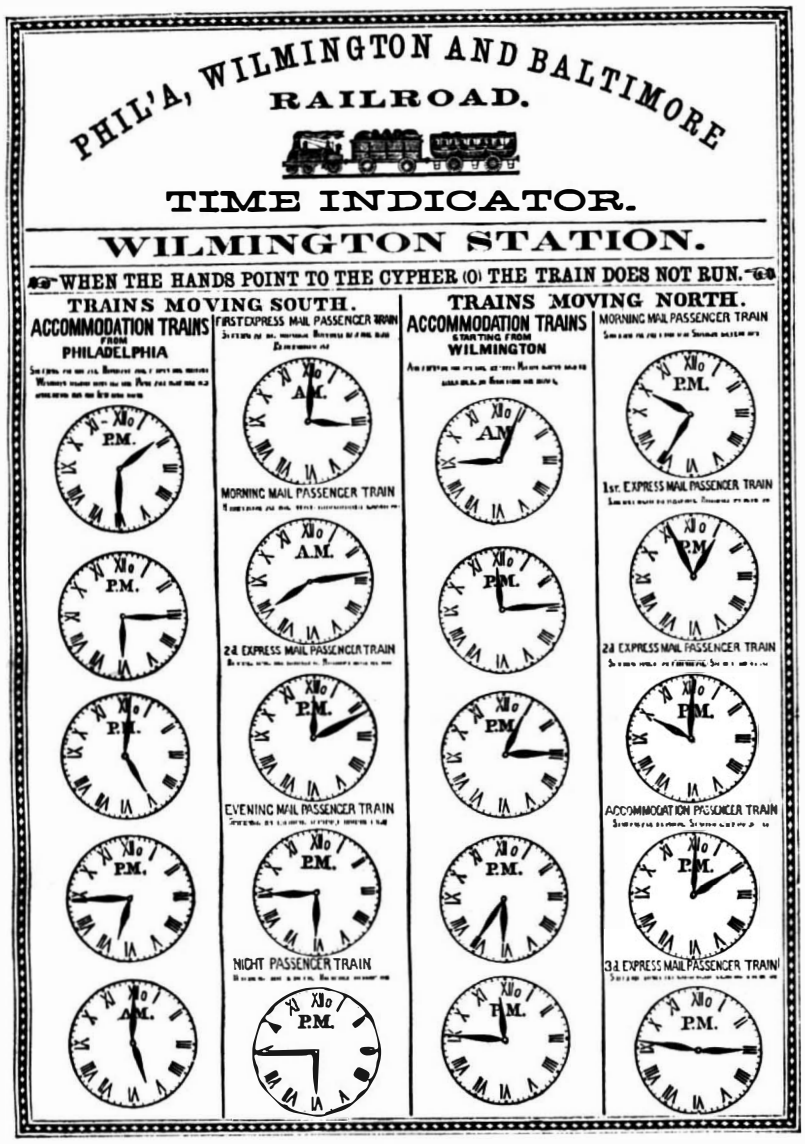
Perpetual Time Indicator.

Much annoyance occurs to travelers from want of facilities to learn the hour at which a certain train is to arrive or depart. Railway clerks complain that they are fretted within an inch of their lives by continual inquiry as to "when the five o'clock train will leave;" and they allege that the incessant questioning they are obliged to put up with justifies them in being as curt and uncommunicative as if they owned the fee simple of the railway and the travelers to boot.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ACCOMMODATION TRAINS STARTING FROM WILMINGTON
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The dial illustrated herewith is designed to relieve the harassed feelings of railway ticket sellers and impart useful information in a civil manner. By it the hour and minute at which any train is to arrive or depart can be seen, and travelers can govern themselves accordingly in confidence. A useful addition to this indicator would be the points of the compass so that a stranger might know the direction the train he is in search of arrives or departs from. Where many trains are entering a depot at all hours, it sometimes occurs that the wrong one is taken. The dials are provided with hands, as shown, which can be turned or set at any figure, in a manner similar to the hands of a clock. There is a small cypher on the face of the dial, between the figures 12 and 1; when the hands point to this cypher the train does not run.

By the adoption of this perpetual time indicator all printed tables in depots and hotels are unnecessary, for if the hour of departure is changed, in winter or summer, it is readily corrected by moving the hand on the dial to be amended.

These time indicators are made upon glass, metal, wood or any other material, and can be surrounded by advertisements or decorated in any desired style. They will doubtless prove a great convenience to the general public.

A patent has been ordered to issue on it through the Scientific American Patent Agency; for further information address the proprietors, Fitzpatrick & Burke, at Box 2,823, Chicago, Ill., or Box 988, Philadelphia, Pa.

The Cyclone at Calcutta.

The correspondent of the London *Times* writing from Calcutta on the 23rd Dec., says:—"I see that the news of 12,000 persons having been lost in the cyclone was received with incredulity in England. The estimate was wide of the truth, but only because it vastly underrated the calamity. As every one who knows this country will readily conceive, there is no possibility of ascertaining precisely the loss of life, because hundreds might be swept away and leave no traces behind. But we are not without data for arriving at a conclusion, and it has now been calculated that there cannot have been fewer than 60,000 persons drowned or otherwise killed by that fearful storm. In the island of Saugor alone, before the cyclone, there were 8,200 persons. There are now 1,200—nor have any left it to go elsewhere. 7 000 persons, were carried clean away by the wave. All up the river the population has been swept off, if not in the same proportion, yet in very large numbers. As we all anticipated, disease is raging everywhere—cholera, fever, and smallpox. The epidemic fever, which I mentioned in previous letters this year, is depopulating whole districts. A magistrate told me the other day that he had been riding through a village in which there was hardly a grown-up person left. They had died without hope of assistance, without medicine, without food—for the crops were rotting on the ground in many parts where the salt water rushed in. The Bengalese are in a deplorable plight, and the zemindars increase the general misery by turning the ryots out of their huts because they are behind-hand with their rents. There is money enough to give relief—such relief as can be got for money. But human means seem quite powerless to stop the awful diseases that are walking through the land, carrying thousands before them. The native feels himself ill, wraps himself in his blanket, says it is fate, and so perishes. In this enormous population—let it be remembered that here in Bengal alone we have at least 45,000,000 of people—the few Europeans can only do good here and there, and yet it is solely by Europeans that good is being done. The rich native will not help his countrymen. God gave him his money, and God intended him to keep it. That is pretty much his mode of reasoning. Sometimes the fever strikes him, and then in abject terror he offers English doctors a fee of 500 rupees to come and visit him. In a recent case of that sort, the man—who was worth about four millions sterling—had refused to give a pice to the poor after the cyclone. When death was at his throat he altered his mind, and promised large benefactions if he recovered. He was not spared to add falsehood to his cruel service.

ECONOMICAL ENGINEERING.—There is a proposition afloat to build a railway from Siam to China; and the King of Siam, if an engineer is sent to examine the route, "will furnish elephants and give protection from Bangkok, through his dominions to Hluang Phrabang; but he cannot furnish the means to pay passage and salary, and fears it will be wasting all his money. He is also fearful that the engineer will get intoxicated and fall into the river and be drowned, or on account of change of climate die of dysentery, or from traveling in the jungle may die of jungle fever, the same as many others have done, and thus the business prove a failure, and the money wasted."

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